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Unusual Applications of Stainless Alloys

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EIGHTEEN - EIGHT stainless steel, because of its low elastic limit and very high ductility, lends itself very readily to severe drawing work. This applies not only to cold forming, but to hot forming as well. It is true that 18-8 hardens rapidly when cold worked, which characteristic decreases somewhat its ease of fabrication and which results, in some cases, in considerable wear of dies unless special alloy tool steels and specially selected drawing lubricants are employed. Even then satisfactory results will not be obtained if the material being drawn is not of maximum softness and small grain size.

Small grain size is important, as it will avoid granulation or "orange peel" in the drawn object, which, if present, results in increased polishing time and costs. Tests have also shown that the small grained 18-8 really draws better than the large grained structure. With controlled and supervised annealing and the proper selection of analysis, small grained 18-8 having a Rockwell hardness of 80 maximum is available for extra deep drawing work. For ordinary drawing work material of 85 B maximum is more or less standard.

There are many articles which would be of superior quality, appearance and utility if made of stainless steel. Some of these articles are perhaps of intricate shape and design, and after one or two unsuccessful attempts to make them from stainless steel the idea would be discarded. Often there are grounds for such action, as the extra costs involved, could the article be made successfully, would result in an exorbitant price as compared to other satisfactory materials. In other cases, after careful analysis of the problems involved and the application of the proper quality of metal, the various obstacles have been surmounted and a really worth while product has been the result.

Forming a Wheel of 18-8 Alloy

An example of this is shown in the photographs of the spider for the automotive air wheel which was made by the Cleveland Welding Co., Cleveland. This is shown before and after assembling into the completed wheel. The hub cap is of chrome plate. The particular type of metal is 18-8 and it was especially processed at the mill to fit the particular requirements of this job. The structure of the metal is shown in the accompanying photomicrograph.

WHAT the author emphasizes is that apparently difficult manufacturing processes are too often regarded as barring the use of the 18-and-8 and other chromium-nickel steels. Instead a careful analysis of fabricating problems will frequently disclose the feasibility of adopting the stainless alloys and result in the production of articles of truly economic value. Examples are detailed to illustrate the point.

A number of unsuccessful attempts were made with various other stainless steels. When this job was finally successfully completed, it was done on the regular set-up and dies used for ordinary steel, with some slight adjustments. The blank size was 0.078 in. thick, 4½ in. wide and 55 in. long. The first operation was to trim the blank to proper size and contour, which was followed by drawing cups of approximately 1⅛-in. depth suitably spaced. The blank was then annealed at 1900 deg. F. for 3 min., followed by quenching in water. The very slight oxide formed in annealing was not removed, as it has been found that such an oxide is often beneficial, acting as a lubricant.

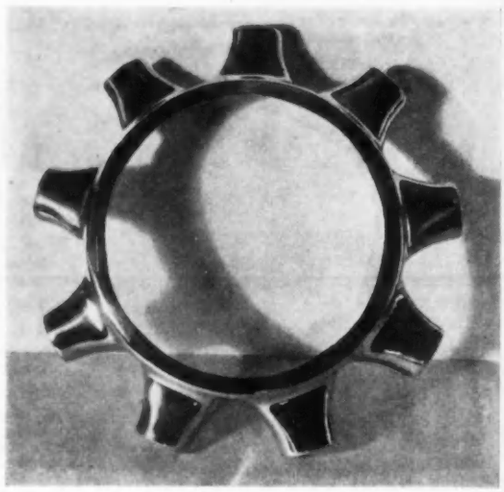
The final operation, which is progressive and is done in six steps, was completed without further annealing. After a trimming operation the section was rolled into a ring and the ends flash welded together. The concluding operation consisted of expanding to correct size, spinning in of the flange and flattening it. The expanding operation, by the way, is a good test of the quality of the weld.

The spider was polished in three operations to a mirror finish comparable to that of chromium plate, and it is a finish that will remain bright and free of rust and corrosion throughout its life. Similar wheels of plated composition show rust within a few months, due to the hard usage a wheel encounters. This is not, however, intended to be a discourse on the relative merits of chromium plate versus stainless, but primarily a discussion of some of the difficult forming jobs wherein 18-8 has been successfully applied.

Hot-Forming 18-8 Seamless Cylinders

A second example applies to the hot forming of large seamless cylinders from 18-8S material. Such cylinders, after considerable experimental work and close cooperation between the steel producer and fabricator, have been made not only from 18-8 but another analysis commonly known as

SPIDER and the completed assembly of a wheel made by the Cleveland Welding Co. of Enduro 18-8 metal, with the hub cap chromium plated.



NC-3, in which the chromium and nickel contents are approximately 25 and 20 per cent respectively. The completed cylinder, as here shown, is the ordinary gas cylinder. It was made on the same equipment as used for making common steel cylinders. The fabricator in this case was the Taylor-Wharton Iron & Steel Co., Easton, Pa. The billets used in the manufacture of the cylinders were heated carefully to about 2250 deg. F. and hot pierced under a powerful press. Following reheating the partially completed cylinder was hot drawn through successively smaller dies until the desired size was obtained. The opened end of the cylinder was then necked down, making the completed seamless tank.

Several cylinders of 18-8 and NC-3 have been in service for several years, operating under high pressures and subject to the action of severely corrosive gases. The availability of this type of cylinder for the shipment of corrosive gases and liquids or for retorts in the processing of such products should be of considerable value to the manufacturing chemical plant. dye plants and allied industries. The two grades of stainless steel which lend themselves to this type of fabrication are completely corrosion resistant to a great number of chemicals, acids, gases, etc.; the notable exceptions are hydrochloric, sulphuric and hydrofluoric acids.

The 18-8 type is oxidation-resistant to approximately 1600 deg. F., and NC-3 to 2000 deg. F., both types having very high creep strengths at elevated temperatures. Heavy walled seamless tubing can also be furnished by the above process, although there is a restriction to the length that can be furnished. Such tubing should be satisfactory in connection with oil refining equipment, particularly in sizes beyond the limits of the seamless tube mills, both for diameter and wall thickness.

There have been a number of other pieces of equipment made from various grades of stainless steel, which at first glance seemed impossible to process. Continued cooperation between the steel producer and the fabricator, however, has resulted in the successful application of stainless alloys to many articles, which have allowed the ultimate user to make extensive savings.

The initial cost in many instances is greater for the stainless, but the added life of the equipment and reduced maintenance costs result in substantial savings. Where foods, dyes, chemicals, etc., are being processed in stainless steel equipment there is no chance of spoilage, decomposition and deterioration due to contamination from the metal.

New Silicon-Carbide Refractory Brick

AN improved silicon-carbide refractory brick for electric furnaces has been developed. It has been given the name tercod and was described by G. S. Diamond, vice-president, Electro Refractories & Alloys Corpn., Buffalo, N. Y., in a paper presented to the recent meeting in Montreal of the Electrochemical Society.

The brick consists of a mixture of silicon carbide, with or without graphite, a carbon bond and a protective boro-silicate glaze to prevent oxidation. An outstanding physical property is a low coefficient of thermal expansion—one-ninth that of silica brick and less than one-half that of any other low-expansion refractory brick. It is therefore regarded as having a particular field where rapid temperature changes occur. Thus it is considered as promising especially to eliminate spalling troubles and to reduce strains in furnace linings and roofs. It is stated, for example, that a wall of tercod 10 ft. long expands 0.22 in. when heated from room temperature to 1300 deg. F., while the same size wall of silica expands 2 in. under the same heating.

The accompanying tabulation, contributed by the author, covers some of the properties of the glazed tercod brick, together with corresponding properties of silica brick. He says that tercod is inert to acid or neutral slags and also inert to non-ferrous metals. It is also inert to contact with cast iron of a total carbon of 3 per cent or higher. It is not inert to iron having lower carbon percentages, as such iron will absorb carbon from the refractory. This absorption of carbon and also easy attack by basic slags and fluxes precludes the use of tercod as bottoms in electric steel melting furnaces. Accordingly the field for this refractory in steel melting furnaces comprises upper walls, door jambs, door arches, door bricks, sills,

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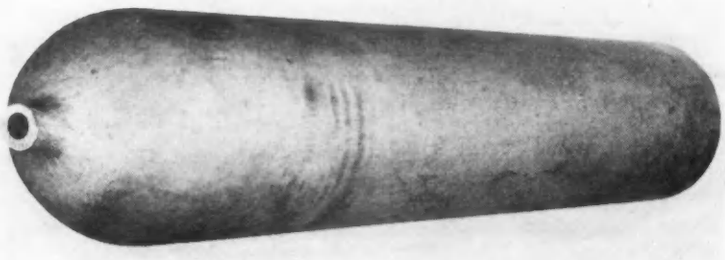

Gas cylinder of Enduro 18-8S metal, made by the Taylor-Wharton Iron & Steel Co., Highbridge, N. J.

Titanium in Gray Cast Iron

By GEORGE F. COMSTOCK
Metallurgist, Titanium Alloy Mfg. Co.

THE chromium-bearing iron treated with 1 per cent ferrotitanium was especially noteworthy, since it was the strongest of any in the tests shown in Table III. (See previous instalment, THE IRON AGE, May 11). Yet this mixture had the lowest cutting resistance in the shaper and lathe tests. The nickel-chromium and molybdenum irons were distinctly inferior. The microstructures of all these samples were examined, and the titanium-treated irons showed the finest graphite as usual. The nickel-chromium iron was even coarser grained than the untreated, and the plain chromium and molybdenum irons were nearly as coarse. The latter was peculiar in showing much more ferrite than any of the others. All the samples containing chromium showed no ferrite, more finely lamellar or sorbitic pearlite than the samples without chromium, and distinct particles of a hard white carbide (probably chromium carbide) associated with the steadite (phosphide eutectic). These characteristics of the chromium-bearing iron were always found in subsequent tests with chromium. For illustrations of similar structures Figs. 9 to 17, representing a latest test, should be referred to.

The fractures of these alloy cast irons were also interesting, the titanium-treated fractures being distinctly and consistently darker and finer than the untreated or those treated with chromium or chromium and nickel.

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THIS is the second and concluding part of the author's description of recent results obtained by the addition of titanium to foundry iron. The previous instalment appeared in the May 11 issue of The Iron Age, on pages 744 and 745. Increased strength combined with machinability, the author concludes from the tests, is best obtained by combining chromium and titanium as alloying materials.

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The molybdenum iron fractures were as dark as those with titanium, but not so fine. Some chill-test castings of these irons with sections only ⅛ in. thick showed white iron ½ in. from the edge with chromium alone, while both titanium and nickel, with the chromium, decreased the white border to a thickness of ¼ to ⅜ in.

Titanium in Electric Furnace Iron

It will be noted, in studying Table III, that although the carbon contents of the samples in Test E were quite uniform, the silicon contents were not. Thus the effects of the alloys that were added intentionally may have been masked by variations in the silicon content. To avoid this uncertainty, which seems to be inherent in cupola melting, it was decided to have a similar series of samples made from a heat of electric-melted iron, where all the metal used would be drawn from one bath of uniform composition. The first heat tested in this way (Test F) contained 1.35 per cent silicon and 2.83 per cent carbon, and the test bars were all noticeably white in fracture except the one treated with 1 per cent ferrotitanium, and the one treated with chromium and nickel. The former was entirely gray and was easier to machine, but less strong than the latter, which showed traces of whiteness. Fractures of sections ⅝ by 1½ in. are illustrated in Fig. 18, where the graphitizing tendency of the ferrotitanium is evident. The microstructures again showed finer graphite in these titanium-treated test bars than in those treated with chromium and nickel, or with molybdenum.

Two later tests in electric-melted cast iron were more successful, and results from them are given in Table IV. These values were obtained by the use of the same test methods as have already been described. Cutting tests were made on only three samples, as indicated.

The silicon and total carbon contents of the samples in each of the two tests, G and H, respectively, were sufficiently uniform to permit valid conclusions to be drawn as to the effects of the various alloys intentionally added. In test G, molybdenum

TABLE IV—ELECTRIC-MELTED GRAY IRON TREATED WITH VARIOUS ALLOYS

	Test G							Test H						
Ferrotitanium added, per cent	None	1.00	None	1.00	0.5	None	None	None	1.00	None	1.00	1.5	None	None
Titanium content, per cent	0.051	0.147	0.072	0.138	0.105	0.087	0.084	0.042	0.114	...	0.126	0.138	...	...
Chromium content, per cent	...	...	0.56	0.54	0.48	0.62	...	Trace	...	0.72	0.74	0.73	0.75	...
Other alloy content, per cent	...	...	...	...	...	1.35 Ni	0.46 Mo	...	...	...	...	...	1.27 Ni	0.42 Mo
Silicon content, per cent	2.09	2.23	2.10	2.21	2.12	2.10	2.19	2.24	2.26	2.23	2.25	2.24	2.24	2.24
Graphite content, per cent	2.91	2.96	2.74	2.71	2.74	2.71	2.77	2.49	2.54	2.35	2.34	2.34	2.36	2.47
Combined carbon, per cent	0.55	0.51	0.73	0.72	0.70	0.70	0.62	0.68	0.64	0.83	0.82	0.84	0.81	0.69
Total carbon, per cent	3.46	3.47	3.47	3.43	3.44	3.41	3.39	3.17	3.18	3.18	3.16	3.18	3.17	3.16
Transverse strength, lb.	4,450	4,673	4,823	5,004	4,835	4,789	5,093	4,400	4,512	4,390	4,930	4,625	4,672	4,362
Increase over untreated, per cent	...	5.0	8.4	12.4	8.7	7.6	14.4	...	2.5	...	12.0	5.1	6.2	...
Deflection, in.	0.153	0.149	0.145	0.146	0.145	0.139	0.170	0.125	0.134	0.107	0.112	0.110	0.106	0.115
Tensile strength, lb. per sq. in.	38,820	35,660	36,520	38,700	37,240	38,640	38,960	38,840	39,900	43,020	46,680	45,980	42,940	44,300
Increase over untreated, per cent	...	5.4	8.0	14.4	10.1	14.2	15.2	...	2.7	10.8	20.2	18.4	10.5	14.0
Brinell hardness at center	187	196	202	207	187	207	202	192	196	217	223	217	217	217
Brinell midway between center and edge	187	196	207	217	207	217	207	196	207	223	235	235	223	228
Comparative resistance to cutting:														
Lathe test, 0.00313 in. feed	...	...	...	22.5	...	28.0	27.0	...	...	...	...	...	...	...
Lathe test, 0.00694 in. feed	...	...	...	37.5	...	41.0	39.0	...	...	...	...	...	...	...
Drill test, torque	...	...	...	19.0	...	20.5	20.5	...	...	...	...	...	...	...
Drill test, thrust	...	...	...	880	...	900	900	...	...	...	...	...	...	...

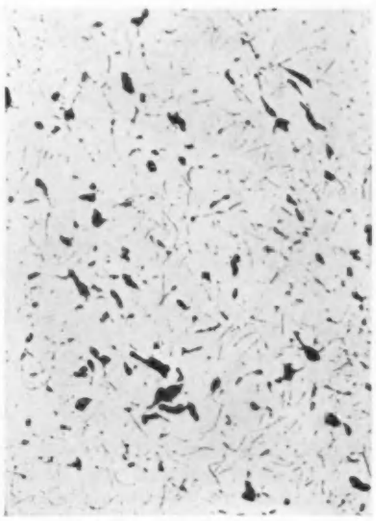

Fig. 9. Untreated Iron

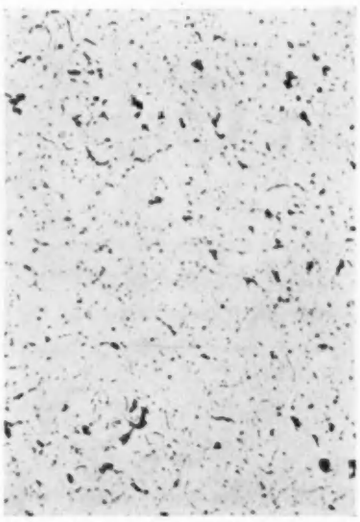

Fig. 10. Iron Treated with 1 Per Cent Ferrotitanium Alone

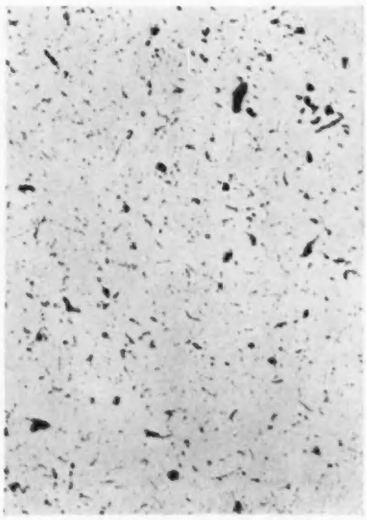

Fig. 11. Iron Treated with Chromium and 1 Per Cent Ferrotitanium

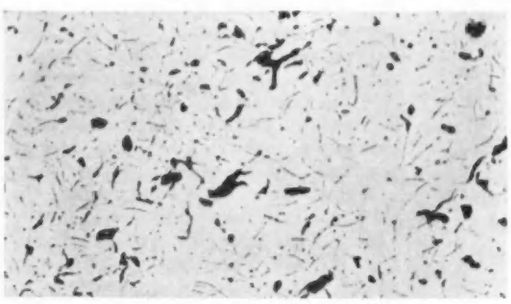

Fig. 12. Iron Treated with Chromium and Nickel

TYPICAL views of the graphite midway between center and edge of cross-sections of bars 1.23 in. in diameter, from Test G (see table 4). All unetched and magnified 50 diameters

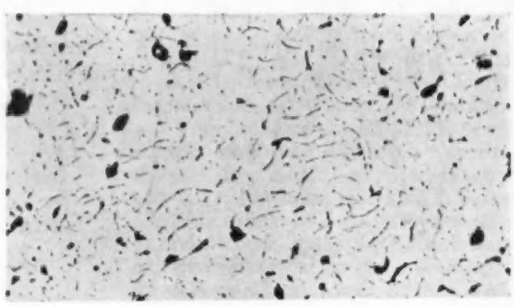

Fig. 13. Iron Treated with Molybdenum Alone

gave the strongest iron, but the machinability was not so good as that of the chrome iron treated with 1 per cent ferrotitanium, which was very little inferior in strength. In test H, as in test E, the chrome iron treated with 1 per cent ferrotitanium was stronger than any of the others. The nickel-chromium iron was not so good in any of the three tests. In the chromium-bearing irons neither 0.5 per cent ferrotitanium as in test G, nor 1.5 per cent ferrotitanium as in test H, gave as good results as the 1 per cent addition. There was some increase in strength with titanium alone, and some with chromium alone, but the combination of the two gave an increase in strength in all instances nearly equal to, or sometimes even greater than, the sum of the effects of the two additions separately.

Microstructures and Fractures

The microstructures of all these samples were examined in the usual way, using polished specimens about

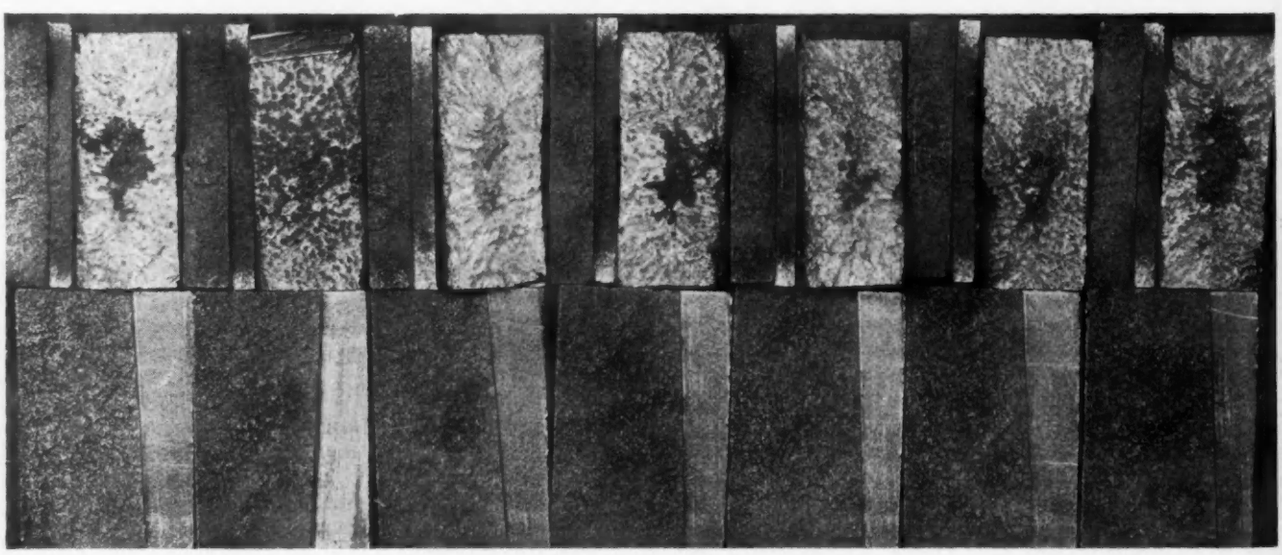

Fig. 18. Fractures of Chill-Test Castings from Tests F and G, Enlarged 1.0 Diameters. (The order of arrangement is the same as in table 4, or as follows from left to right:—1—Untreated iron. 2—Treated with ferrotitanium alone. 3—Chromium alone. 4—Chromium and 1 per cent ferrotitanium. 5—Chromium and 0.5 per cent ferrotitanium. 6—Chromium and nickel. 7—Molybdenum alone. Bottom row shows 1 by 1.5 in. sections from Test G. Top row shows ¼ in. and ⅛ in. sections from Test G and ⅝ in. sections of lower-silicon iron from Test F)

Fig. 14. Untreated Iron, Showing Coarse Graphite, Lamellar Pearlite, and very little Ferrite

Fig. 15. Iron Treated with 1 Per Cent Ferrotitanium Alone, Showing Finer Grain and More Ferrite than Fig. 14

Fig. 16. Iron Treated with Chromium and 1 Per Cent Ferrotitanium, Showing Sorbitic Pearlite, Bright Carbide Areas with the Spotted Steadite, and fine Crystals of Titanium Cyanonitride.

TYPICAL microstructures of cross-sections of bars 1.23 in. in diameter from Test G (see table 4). All etched with picric acid and magnified 400 diameters

Fig. 17. Iron Treated with Molybdenum Alone, Showing Considerable Ferrite, and Less Coarsely Lamellar Pearlite than Figs. 14 or 15

½ in. wide, cut from cross-sections of the 1¼ in. round bars so as to extend from the edge of the section to beyond the center. The results of this study agreed almost exactly with what has been reported for Test E. The titanium-treated irons showed the finest graphite; the chromium-bearing irons showed more sorbitic pearlite, and carbide in the steadite; and the molybdenum iron was not particularly fine-grained, showed considerable ferrite, and usually less steadite than the others. The only structural explanation for the high strength of the molybdenum iron in Test G that could be arrived at was that the slightly more sorbitic pearlite conferred a superior notch toughness on the iron, so that the coarse graphite flakes did not have such an injurious effect. The graphite did not appear to be enough finer in that iron than in the untreated to account for its high strength, as was true of the titanium-treated irons. Photomicrographs of representative structures of the irons of Test G are shown as Figs. 9 to 17, and these may be considered as quite typical also of Tests E and H, except that in the latter there was less graphite.

The fractures of the samples in Tests G and H showed about the same comparative appearances as have been described for Test E, the titanium-treated irons being characterized by dark and fine fractures. Chill-test castings were made of all these elec-

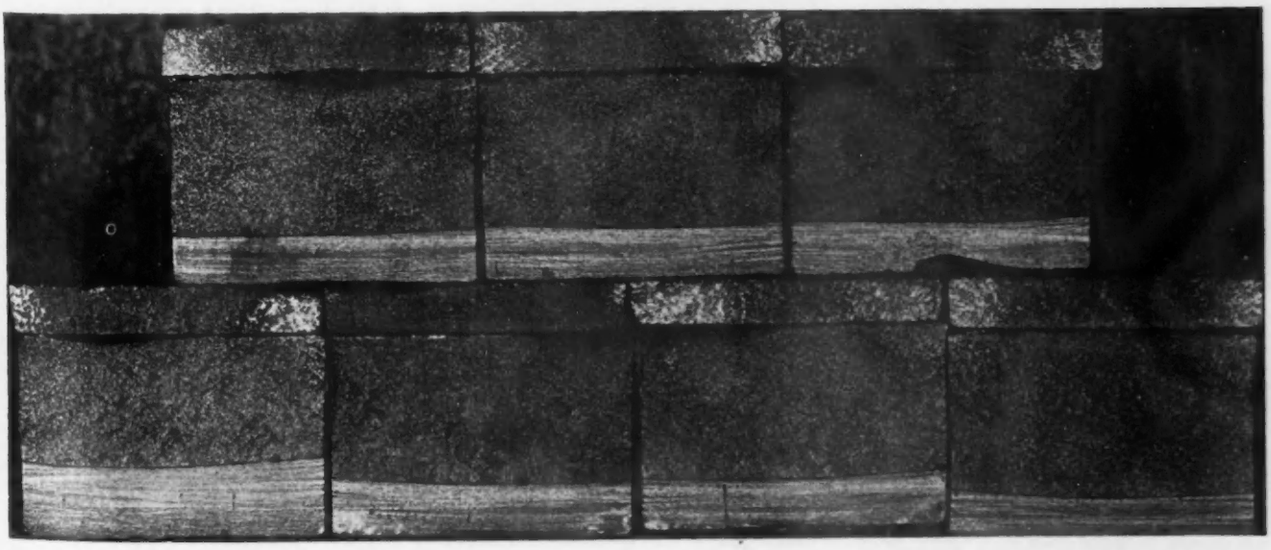

Fig. 19. Fractures of Chill-Test Castings from Test H, Enlarged 1.2 Diameters. (The fracture of the ¼ in. section of each kind of iron is shown on top of the fracture of the 1 in. section of the same casting. The bottom row includes from left to right, the untreated iron first; 2—treated with ferrotitanium alone; 3—with Chromium alone; 4—chromium and 1 per cent ferrotitanium; and continuing in the upper row, 5—Chromium and 1.5 per cent ferrotitanium; 6—chromium and nickel; 7—molybdenum alone)

tric-melted irons in the form of a stepped bar about 8 in. long, 1½ in. wide, and varying in thickness in five steps from 1 in. at one end to ⅛ in. at the other. These bars were broken in a vise through the centers of the steps of 1 in., ¼ in., and ⅛ in. thickness. The ⅛-in. fractures in test H were all white; the other fractures for tests G and H are shown slightly enlarged in Figs. 18 and 19. In Fig. 18 are also shown the ⅝-in. fractures from Test F, as has been mentioned below. These illustrations probably do not require further comment; the fineness of the thick titanium-treated fractures may not be very striking in the printed reproductions but the graphitizing tendency of the ferrotitanium on the white iron and on the thin sections which tended toward whiteness at the edges, should be quite evident. In every test, titanium showed as much effect as nickel in counteracting the tendency of chromium to make the iron white.

Cost Relations

The cost relations of these alloy irons should be of considerable practical interest, in view of the properties that have been described. The regular price of chromium in the form of the high-carbon alloy which is used in cast iron is believed to be 10c. per pound; the price of the ferrotitanium used is 25c. per pound; nickel is 35c. per pound; and molybdenum in the form added to cast iron is believed to be 95c. per pound. The cost of alloys per ton of iron in test G and H was computed at those prices, assuming no losses of chromium, nickel, or molybdenum, with 1 per cent ferrotitanium, 0.45 per cent molybdenum, and 1.25 per cent nickel used in both tests, 0.55 per cent chromium in test G and 0.75 per cent chromium in test H, with results as follows:

	Test G	Test H
Chrome-titanium	$6.10	$6.50
Chrome-nickel	9.85	10.25
Molybdenum	8.55	8.55

It is realized of course that in these tests we have not secured the high strength values that have been reported by others for chrome-nickel or molybdenum cast iron. Some of those results, at least, were obtained by the use of such large alloy additions as would make the iron rather expensive for commercial applications. We have tried to confine our tests to strictly practical conditions, bearing in mind the value of economy, as well as the adaptability of the alloy to ordinary foundry practice.

The results so far obtained with titanium in cast iron may be summarized by stating that it has been found to decrease the size of the graphite flakes, and to promote graphitization and the formation of ferrite. The first effect strengthens the iron, but the latter effect may weaken it. Therefore in most irons of ordinary composition it is better to use a hardener, such as chromium, with titanium, if the maximum strength is desired. Chromium has been found to counteract the graphitizing effect of titanium, and strengthens cast iron by making the pearlite more sorbitic; titanium counteracts the hardening or chilling effect of chromium, and strengthens the iron by reducing the size of the graphite flakes. With the combination of titanium and chromium in cast iron, a more easily machinable as well as a less costly high-strength iron has been made than by the use of other alloys such as chromium and nickel, or molybdenum.

Carbon Steel Beer Keg Is Cold-Formed and Welded

BREWERS are rapidly adopting the steel beer keg. Although numerous designs of steel kegs are now available, there is one made by the A. O. Smith Corpn., Milwaukee, known as the "New-Way" barrel, in which special efforts have been made to approximate closely the advantages in handling that were offered by the old-time wooden keg.

The steel keg has come about not only because of the alertness of steel fabricators, but also because there is the factor of wood supply for manufacture of wooden kegs. During the period of national prohibition white oak forests were neglected, with the result that practically only two States, Mississippi and Arkansas, have stands that are available for use. Further, the fibre structure of white oak, the most satisfactory wood for beer keg use, is such that the cut lumber requires a long period for air drying. Beer is here, and there is an urgent demand for kegs. Steel is, therefore, taking its logical place in the industy.

Steel Keg Weighs 60 Lb.

Various estimates place beer keg requirements at 12,000,000 units. The Smith package, in the popular half barrel size, weighs approximately 60 lb.

Parts for this steel beer keg are formed cold and welded in place. Medium high carbon steel is used throughout.

If this barrel is typical of what will be used and steel barrels to the above extent were required, it is simple to figure that there is a potential market for upwards of 350,000 tons of steel. Cut this figure in two and it is still impressive. Wooden packages in the half barrel size sell for $6.50 each and an empty half barrel weighs 70 lb. The steel keg manufacturer, therefore, has had to consider price, service, weight and convenience of handling.

The half barrel container manufactured by the Smith corporation consists of a steel cylinder of 15½-gal. capacity. It is made of medium high carbon steel and is expanded ½ in. on the diameter at the center so that the barrel will drain. The longitudinal seam is electrically welded. The bilge on wooden kegs was needed so that the hoops could be driven tight.

However, workmen handling these barrels soon learned a few tricks —one was that the keg could be up-ended easily by rocking it on its side, which lessened the physical effort of setting the filled barrel on end. Also, the bilge aided the handler to roll the keg and make it take a direction other than at right angles to the axis of the keg. With these advantages of the wooden barrel in mind, the Smith keg was designed with a steel bilge which is welded to the outside of the cylinder. This bilge is pressed to the desired contour as it is rolled to a circle. Its seams are welded. Dents in the barrels and in the flanges are to be avoided and all precautionary measures are taken in the design and selection of the material to avoid dents occurring in these parts. The heads, made of medium high carbon steel, are electrically welded into the barrel. Flanges, or chimes, are especially rolled and welded to the barrel ends; corners of the flanges are rounded and are easily gripped, but the area that bears on the floor is broad and flat, facilitating stacking one barrel on top of another. The free edge of the flange is turned under so that no raw steel edge is exposed.

The bung fitting is made of cold worked carbon steel welded to the

(*Concluded on Advertising Page* 12)

Enameling In Automatic Gas Furnaces

By J. B. NEALEY
American Gas Association

APPLYING enamel and burning or vitrifying it at high temperatures, lends itself admirably to progressive, straight-line machine production with the furnace converted into a heating machine that is continuous and automatic in operation. All of this is accomplished by grouping the different operations such as dipping, spraying, drying, brushing, burning, etc., about a single overhead loop conveyor which takes the product from one to the other.

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MECHANIZING the processes of decorating steel products grows apace in manufacturing plants where the volume of sales is sufficient to support mass production.

Practically all of the plants of the American Stove Co., the world's largest manufacturer of stoves, gas ranges, etc., are thus equipped. One of these automatic units in its New Process-Reliable Division, Cleveland, is here described. The furnace proper is built of brick, properly stayed and is fired with gas fuel. It is 62 ft. long and 4½ ft. wide, with the exception of the hot zone, where the gas burners are located. This zone is 17 ft. long and 10½ ft. wide, and one end of it is about 22½ ft. from the charging end of the furnace. This 22½ ft. is known as the preheating zone, for the waste heat from the hot zone flows in this direction and preheats the cold ware coming through.

Conveyor Is a Single Chain Loop

That portion of the furnace beyond the hot zone, which is about 26 ft. in length, is known as the cooling zone, and here the ware cools off to a point where it can be handled by operators as it leaves the furnace. The conveyor consists of a closed chain loop, suspended from supporting steel work, one portion located just above the roof of the furnace and the other side 8 ft. away and parallel to the first. It extends 8 ft. beyond the charging end and 20 ft. beyond the discharge end so as to provide plenty of space for the operators to place and remove the ware from the tools suspended from the chain. There are 64 tools.

Below the hearth level is a tunnel 2½ ft. square which extends the entire length of the hot and preheating zones, beginning at the cooling zone. This furnace is of the full muffle type, two muffles of Carborundum slabs, one ft. wide and two ft. high, being located on each side of the furnace chamber, and extending the length of the heating zone. The gas burners fire directly into these muffles and the heat flows down into the tunnel where it heats the hearth of both the hot and preheating zones. The waste products of combustion are finally exhausted at the far end of the preheating zone through a stack located close to the charging end of the furnace.

Burners Located in End Walls

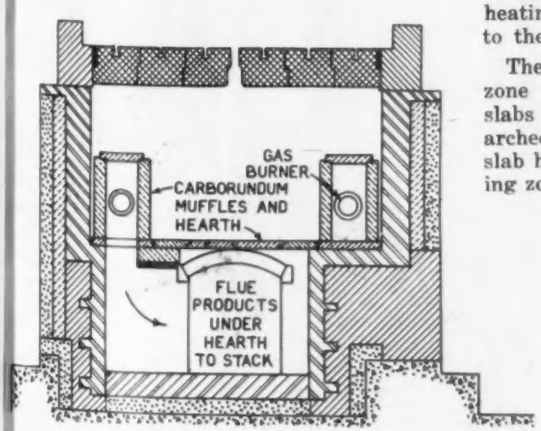
As stated, there is one muffle on each side, or two in all. These are heated with a burner each, the burners being located in the end walls of the preheat zone and firing directly into the ends of the muffles. The muffles are above the hearth level and the hot products of combustion flow from these, through ducts, down into the tunnel below the hearth and heat the hearths of both the hot and preheating zones, during their passage to the stack.

The furnace chamber in the preheat zone is composed of Carborundum slabs 2½ in. thick. The tunnel is arched to support the Carborundum slab hearth throughout the two heating zones while a suspended flat arch composes the roof of the furnace chamber proper. The side walls of the muffles in the hot zone are also of Carborundum but are 4 in. thick while the top slabs are 2½ in. thick. The furnace chamber proper is 4 ft. from hearth to roof and as the muffles are only about 2 ft. high this leaves a 2-ft. space between them and the roof. Thus the tops of the muffles are utilized as heat-radiating surfaces as well as the sides, and the air heated in the spaces above them is circulated through the furnace chamber.

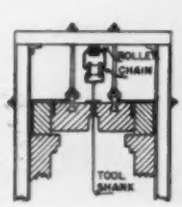
The furnace chamber, through which the ware passes, is thus seen to be T-shaped, 4 ft. high, 8 ft. wide above the muffles and 4½ ft. wide between the muffles. In the cooling zone it is only 3 ft. wide from top to bottom. The furnace walls in the hot zone are 1½ ft. thick, composed of 9¼ in. of pressed firebrick, 4⅝ in. of pressed refractory slab and 5⅛ in. of Sil-o-cel, the latter layer being on the outside of the furnace.

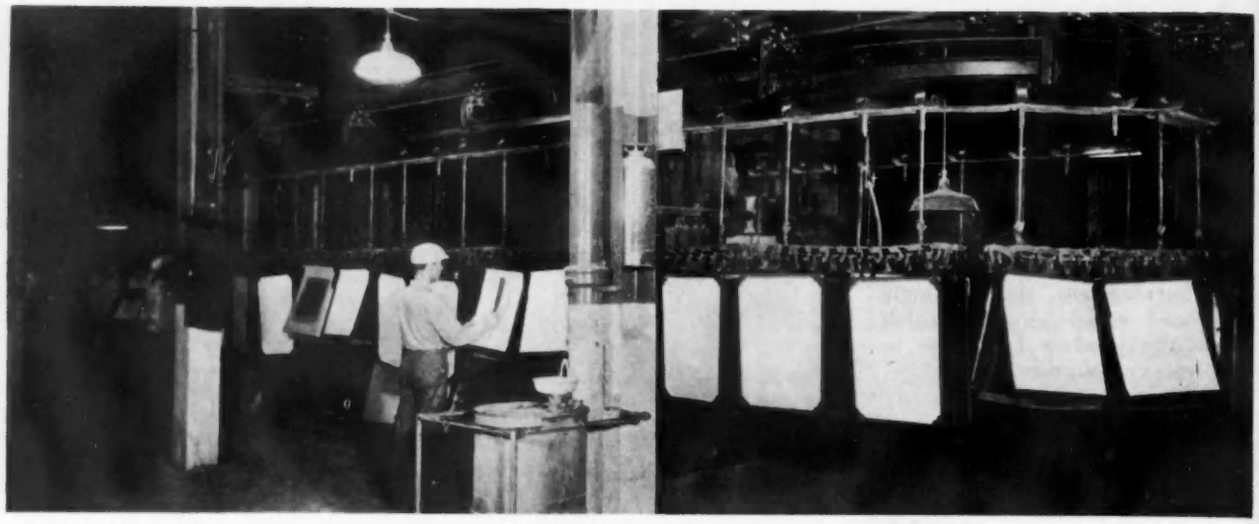
Roof Composed of Suspended Tiles

The roof of the furnace is composed of special arch tile blocks about a foot square, each suspended from steel work, dovetailed and cemented together. A 2½-in. space is left between the two center blocks, thus leaving a narrow opening, for the entire length of the furnace, for the passage of the tools, which hang down from the conveyor chain into the furnace chamber and carry the ware. The chain itself is suspended by a series of brackets with rollers which ride in an I-beam located above the furnace slot. On the shank of each tool is a short steel plate, the plates from adjacent tools overlapping and



Cross-Sections Through Hot and Cold Zones of Enameling Furnace.





A Single-Loop Chain Conveyor Carries the Work Through the Enameling Furnace.

all riding on top of the furnace so as to cover the roof slot and keep the heat from escaping.

The burners are of the premix type and each is provided with an automatic temperature controller and recorder. Gas is piped into the mixer, where it is mixed with the proper amount of air for complete combustion, the volume of air drawn in being controlled by a shutter which regulates the size of the air intake opening. The ratio can also be changed so as to provide any furnace atmosphere required, such as oxidizing, reducing or neutral.

Safety Valve Provided for Gas Cutoff

The temperature control consists of a motor-operated valve in the gas supply line so close to the rotary mixer that the same motor that opens and closes the valve will also open and close the air intake shutter of the mixer by means of a lever. The current to the motor is alternately made and broken with a potentiometer and a thermocouple in the furnace. When the temperature of the furnace rises above that set on the indicator of the controller, the valve motor is energized so that it shuts off the gas flow and closes the air shutter. Conversely, as soon as the temperature has dropped again, the motor is again energized, through the thermocouple and potentiometer, and restores the fuel and air flow.

Also cut into the gas line is a safety valve of the magnetic type, the magnet also being cut into the electric circuit operating the mixer motor. As long as the current flows through the circuit the magnet holds the valve in the open position, but if, for any reason, the current to the motor fails, the magnet lets go and the valve instantly shuts off the gas flow.

This furnace is employed for three-coat work, the dip tubs, brushing wheels, spray booths, etc., being grouped about the exposed portion of the overhead chain conveyor, which is motor driven through a speed reduction gear train. The ground coat is dipped on and the dipped ware stacked on racks handled with high lift trucks. This ware is then hung on the conveyor, passed through the furnace for burning, and, as it comes out, is transferred to inspection tables where it is inspected and replaced on the racks for delivery to the spray booths. Here the first white coat is sprayed on, air dried, brushed, and

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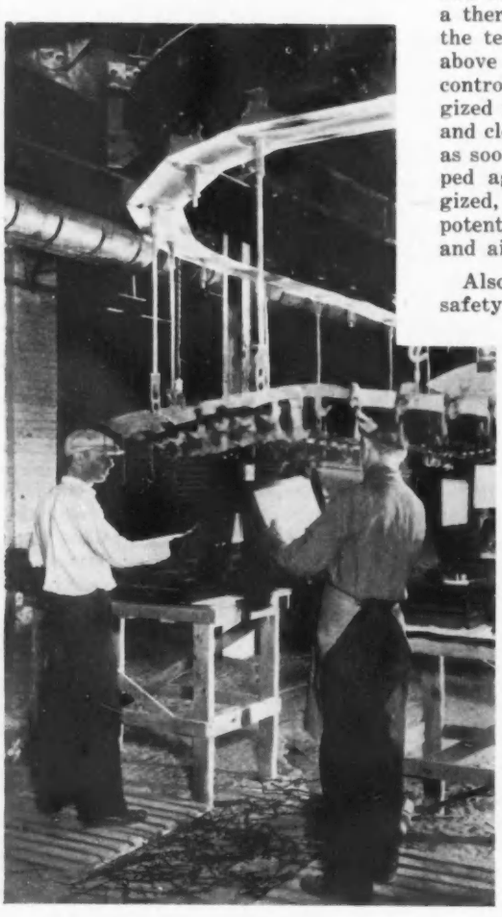
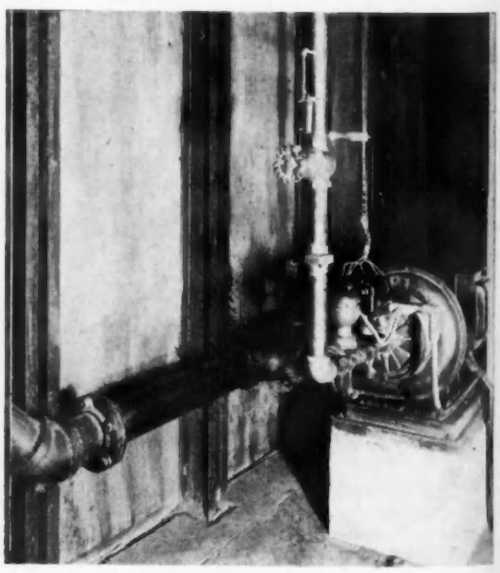


Inspecting and Hanging the Work on the Conveyor (at Left).



A Motor - Operated Mixer (at Right) Supplies Gas and Air to the Furnace Burners. Note Automatic Temperature Control and Safety Valve.

What the User Should Know About Free-Cutting Steels

By H. W. GRAHAM
General Metallurgist,
Jones & Laughlin Steel Corpn., Pittsburgh

THE case of free-cutting steels, or so-called screw stock, was discussed by Mr. Graham at a recent meeting of the Baltimore chapter of the American Society for Steel Treating. The subject was covered largely from the standpoint of the user. What the speaker had to say about the sulphur content, the open-hearth competition with the Bessemer converter for making these steels, factors which make for free cutting, behavior in heat treating and the economic importance of using the cold-finished product is given substantially in full in the accompanying review of the address.

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IN 1903 the Jones & Laughlin organization was manufacturing Bessemer free-cutting steel to approximately the following limits:

Carbon .....*0.08 to 0.16 per cent*
Manganese .....*0.60 to 0.90 per cent*
Sulphur .....*0.080 to 0.130 per cent*

With only a moderate increase in sulphur content, these limits substantially represent the specification that is in effect today.

About 1925 there began efforts in a number of quarters to achieve improved machining performance by juggling of analysis limits. This movement largely spent itself by 1930, but there are still those who feel that the metallurgical design of a screw steel rests in the writing of a prescription.

At the time this movement began the general specification for Bessemer screw steel set the limits of sulphur content at about 0.100 to 0.160 per cent although the maximum limit was little observed; the records in our organization show sulphur contents over 0.250 per cent as far back an 1910. When this furor of analysis juggling had at least partially subsided there was observed this permanent outcome; the original grade had been replaced by two grades: A "standard" grade at about 0.130 to 0.180 per cent and a "high sulphur" grade at about 0.200 to 0.300 per cent sulphur. Certain manufacturers went to further sub-divisions of grade, based upon various limits for carbon, manganese and sulphur. Here the matter stands today.

In view of the success that attended the added or high-sulphur grade of Bessemer steel, it was only natural that similar methods would be tried with open-hearth steel. In this manner there came into existence open-hearth screw stock, best known as SAE 1120, the limits of which are shown in the table. This grade is still used in substantial quantities:

About 1922 our organization was impressed with the difficulty being experienced in the trade in machining operations on SAE 1020, a low-sulphur steel widely used for carburizing. At that time we were interested in higher manganese contents in various applications, and finally a high-manganese, high-sulphur, carburizing steel was developed which machined very readily. The chemical limits were gradually standardized, and the grade was adopted as SAEX 1315.

Later another grade came into some use, intermediate between 1120 and X 1315, with a manganese content of 0.90 to 0.130 per cent, but this grade has not yet been sponsored by the Society of Automotive Engineers.

Bessemer vs. Open-Hearth Screw Stock

The excellent machining quality of Bessemer screw steel has never been seriously challenged by open-hearth screw stock, except by X 1315 and then usually only under special conditions. However, the success of Bessemer screw stock has stirred the interest of those steel manufacturers who possessed no Bessemer converters. In such a situation it was natural that an effort be made to duplicate Bessemer quality by the addition of ferrophosphorus to open-hearth steel. It was inevitable that such efforts should be attended by little or no success. The nature of Bessemer screw stock which causes it to be free-machining is a complex interaction of phosphorus, manganese and sulphur under the conditions that exist in Bessemer operation; and identical results cannot be achieved in any other way.

There have been those who have criticized the quality of duplex steel, which is made by combining the Bessemer and open-hearth processes. Without discussing duplex steel in general, in referring to free-machining steel, it may be pointed out that the manufacturer who possesses duplex facilities is in a position to introduce into open-hearth screw stock some portion of the Bessemer effect with a consequent gain in machinability.

Rolling and Cold Finishing

There is little to be said about rolling of high-sulphur steels except that they are generally of poor rolling quality and inherently disposed to seaminess. Somewhat better results are obtained with rolling temperatures above the usual level. If the rolling process is interrupted and the still hot, partly-rolled steel is reheated, better surface is obtained, but at a considerable sacrifice in cost. In fact, the cost of producing satisfactory bar steel in the high-sulphur grades is such that the small extras charged for these grades over common bars are very inadequate recompense to the steelmaker.

After chipping to do what can be accomplished in the way of removing seams, the billets are further hot-rolled to bar or rod form by conventional methods that require no description here.

For accuracy of dimensions, for freedom from rolling mill scale, and for improvement of machinability, cold-drawing has been and is widely prac-

SCREW STEEL SPECIFICATIONS

	Bessemer		Open-Hearth	
Element	Standard	High Sulphur	SAE 1120	SAE X 1315
Carbon, per cent	0.08 to 0.16	0.08 to 0.16	0.15 to 0.25	0.10 to 0.20
Manganese, per cent	0.60 to 0.90	0.60 to 0.90	0.60 to 0.90	1.25 to 1.55
Phosphorus, per cent	0.090 to 0.130	0.090 to 0.130	0.06 max.	0.050 max.
Sulphur, per cent	0.100 to 0.180	0.180 to 0.250	0.075 to 0.150	0.080 to 0.130

ticed. This processing commonly consists of acid pickling, coating with lime, and cold-drawing through a die with a reduction in diameter of 1/32 to 1/16 in. After cold-drawing the bars are straightened and polished or for special purposes surface-ground to a very high finish and very accurate dimensions.

In the past decade there has been some tendency to increase speed and reduce the draft in cold-drawing. There are, however, very definite limitations to the amount of variation possible. Some purchasers apparently think that the amount of draft that can be taken is unlimited. An attitude that is not infrequently met is shown by the demand that a desired increase in hardness be obtained by a heavier draft with no change in chemistry when the producer may already be using the heaviest practical draft.

The cost of production increases very rapidly with heavier cold reductions, whether obtained in one or more than one draft. The gain in machinability with heavy drafts as compared to lighter drafts is insignificant and greater hardness or other desired physical properties may be obtained in other ways. For these reasons cold-drawing of screw steel does not ordinarily involve drafts in excess of 1/16 in.

Hot-Rolled vs. Cold-Drawn Stock

In the working out of fundamental economics it is only natural that efforts would be made to use hot-rolled bars in automatic screw machines, thus obtaining a cheaper raw material by escaping charges for cold-drawing. To assist in this effort machine-builders have worked hard to design collets that would handle the hot-rolled bar with its inevitable variation in diameter and under normal conditions its surface of rolling-mill scale.

The substitution of hot-rolled bars for cold-drawn in automatic screw machine operation has not been attended with any widespread success. In the first place the hot-rolled bars must be straightened and sheared more carefully than is usual practice on the hot-rolled product, and frequently it is necessary to pickle to remove the scale. These operations eat up a substantial portion of the cost differential between hot-rolled and cold-drawn bars.

Further, the hot-rolled bars cannot be equal in machinability to the cold-drawn product; and, finally, if any portion of the original bar surface remains on the finished part, the surface appearance is in no way equal to that obtainable with cold-drawn stock.

For all these reasons, it appears in most cases good judgment to pay the cold-drawing cost and take full advantage of the qualities resulting from this processing.

There is a fairly widespread but not well justified belief that high-sulphur steel is of poor physical quality, but the fact of the matter is that it is difficult to demonstrate any appreciable deterioration due to the introduction of added sulphur. In the field of dynamic stresses, so far as impact is concerned, there seems to be very little case against sulphur. From the standpoint of fatigue resistance, which is in the field of dynamic stresses, Bessemer steel, and even Bessemer screw steel, will give an excellent account of itself when compared with standard grades used for engineering construction.

Carburizing Free-Cutting Steel

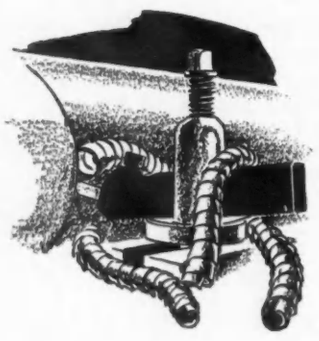
A goodly proportion of parts manufactured from open-hearth screw steel are subjected to heat-treating operations. However, there is involved practically no difference in technique from that employed for ordinary carbon steels.

The higher sulphur content of screw steels appears to slightly retard carbon penetration in carburizing, but this tendency is more than offset by the considerable content of manganese which is now ordinarily carried in high-sulphur steels. We do not know that there has ever been carried out a really exhaustive study of the rate of penetration of carbon in relation to the separate elements, but it is a fact that X 1315, for example, permits such rapid carbon penetration that care must be exercised in carburizing thin wall sections to see that a proper relation of case and core is maintained.

While Bessemer steel cannot be claimed to produce a high-quality carburized part, yet it can be case-hardened and, if a certain amount of core-brittleness can be tolerated, the process can be justified in certain types of application where shock or dynamic stresses are either low or non-existent.

Physical Basis of Machining Quality

It is generally although vaguely understood that a certain brittleness is required for best machinability, and this understanding is entirely correct. However, it is not very important whether the bar is brittle or tough when put into the automatic machine, but it is essential for best performance that the steel should develop a certain amount of brittleness during machining. Bessemer screw steel has the property of dropping very sharply in impact strength as it is cold-worked, and this characteristic contributes to good machining.



Good free-cutting steel, however, not only is brittle but it must also possess a low order of work-hardness, that is, it must not harden too sharply under the cold work of machining.

In other words good free-cutting steel must be soft and brittle, which is a rather unusual combination of physical properties. It must be observed, however, that these statements are made specifically with regard to the progressive cold-work that takes place during machining. Many investigators have attempted to correlate the Brinell hardness of steel to machinability, but such efforts are doomed to be largely unsuccessful, since the hardness in any given condition is not important. The essential fact is the degree to which the steel work-hardens during the machining operation.

Chemical Basis of Machinability

Machining operations are so complex that it is difficult to determine the influence of separate elements with any degree of accuracy, but as a result of years of experience the following remarks may be offered:

Carbon.—The very low carbon steels are very poor in machining quality, apparently because it is almost impossible to make them brittle. The best carbon content for machinability is about 0.10 per cent in Bessemer and 0.20 per cent in open-hearth, while with over 0.15 per cent in Bessemer and 0.30 per cent in open-hearth the cutting quality drops off rapidly.

Manganese.—The influence of manganese follows the same lines as carbon, but the net effect depends largely upon the total content of the hardening elements — carbon, manganese and phosphorus. In Bessemer steel the best machining is in the range of 0.70 to 0.90 per cent manganese and in open-hearth at 0.90 to 0.150 per cent.

Phosphorus. — In Bessemer steel phosphorus is not ordinarily subject to specification, but for best machining it must not be lower than 0.090 per cent. If it exceeds 0.130 per cent it exerts a hardening influence which is unfavorable to free-cutting quality.

In open-hearth steel phosphorus exerts a mildly beneficial influence on machinability up to some high figure which has never been accurately determined. Phosphorus added to open-hearth steel does not have the pronounced hardening effect of the residual phosphorus content of Bessemer steel. As previously stated, added phosphorus is not effective in open-hearth steel, and where free-cutting properties are really neces-

(*Concluded on Advertising Page* 12)

The Machine Tool Industry—Whither Bound?

By R. E. W. HARRISON

Secretary, Machine Shop Practice Division, American Society of Mechanical Engineers

THAT the relatively small but key industry in the long run is bound onward and upward cannot be doubted, but it is well, in these times, to take an occasional look to the rear as well as to the front and the immediate present.

The look to the rear discloses many thought-provoking conditions, chief of which is the fact that the bulk of the machine tool using industries are using equipment, half of which is well over 10 years old. Why? Inadequate design, poor sales presentation, lack of economic attractiveness, or indifference to manufacturing efficiency on the part of the user.

To the writer it seems that lack of economic attractiveness is the most probable answer—economic attractiveness being defined as $\frac{\text{present cost}}{\text{probable cost}} =$ profit on investment x 10 years.

Assuming that the cost element of the equation is properly and fairly computed, the question of the economic attractiveness of the new tool can be reduced to the two elements of productive capacity and investment.

Tool Users Have Been Receptive

That the tool using industry is not indifferent to manufacturing efficiency has been amply proved by the avidity with which it has absorbed the few new tools of the past 10 years, which have possessed an obvious degree of profit-earning capacity—bought at a reasonable price. In other words, those of us who have lived with the problem can easily envisage a small manufacturing milling machine, a precision grinder, and a lathe which have been economically attractive in a large way.

Are we to assume then that the apparent indifference of the user in a buying way is due to lack of appreciation of the profit-earning capacity of the other tools, or is the charge accepted that in the present state of the art these other tools do not meet the requirements of the equation to equal economic attractiveness?

A nice point, and a vital one, for those of us charged with the responsibility for earning a dividend on the capital investment in machine tool designing, building and marketing facilities.

Excess Capacity and the Industry

Another thought-provoking element in this view to the rear is provided by a survey of machine tool manufacturing facilities expressed in terms of an average for the last 10 years as

$$\frac{\text{shipments}}{\text{normal production capacity}}.$$

I am afraid that the average for the industry as a whole is a very vulgar fraction, and if we assume that the fraction is say 6/10 and that the average profit of the industry over the same period has been a meager 4 per cent, would it be logical to apply the reasoning that a revision in manufacturing facilities would result in

say $\frac{10}{6} \times 4 = \frac{40}{6} = 6\ 4/6$ per cent?

Wonderful how our pride of possession expresses itself in a real estate way when the profits of a good three-year stretch in a poor 10-year cycle begin to burn holes in our pockets.

This look backward would be not nearly complete without a peep at the costs of distribution. The writer recalls a case which in a measure is typical, and which would be funny if it were not so tragic. A medium-sized unit of a big Middle West corporation was given the job of making a number of transmission units because the equipment at the plant was particularly suited to produce this work.

The news of this move, not disclosed by the buyer, brought over 200 machine tool salesmen to this plant within a couple of days, where normally three per day would call. Very few tools were to be bought, practically no inquiries had been sent out, and the staff, busy with their own intimate problems, did not desire to be worried into insanity by responding to the calls from the reception desk.

Costly Selling

True the machine tool industry was on its toes, but it is safe to say that far more money was spent by the industry in traveling, hotel and salary bills than was spent by the user in buying the equipment.

History is the text book of kings, and so it should be for the lesser mortals.

To those responsible for our destiny, when answering the question—whither bound? I would say—blame not the user unduly for his apparent lack of appreciation of those pearls which we cast before him, but encourage him in his present hour of distress by expounding the virtues of the money box of our mutual childhood days, the money box in his present case being a sane equipment policy, subscribed to as religiously as his personal household expenses, his country club, and his just business debts—likewise remembering the parable of the mote and the beam. Bear well in mind that, in the very last analysis, the economic efficiency of this wonderful little industry of ours is but a reflection of how well we design, we build and we market, no matter how blue our eyes may be, or how curly the hair on our collective heads.

No Dolls for Her

THIS industrial-minded New York beauty tosses dolls aside to play with tiny models of oxy-acetylene welding equipment. These models will be displayed by Union Carbide & Carbon Corpn. at A Century of Progress in Chicago.

More Comment on the "Anti-Trust" Laws

NO single subject is of more importance today than the President's proposal, written into the Industrial Recovery Act, to remove, temporarily from American industry, the hampering shackles of the "restraint of trade" laws. We believe that these obsolete laws, designed for a "horse and buggy" age, should be replaced by modern protective acts and not merely left hanging over industry by temporary suspension.

In the June 1 issue of The Iron Age, we published letters of comment on this subject from representative heads of metal-working companies. So many interesting letters were received too late to present in that issue that we are including them in this concluding instalment.

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WE earnestly approve of the appeal of Henry A. Wise Wood.

Furthermore, we are in agreement with your analysis of the industrial situation, with the possible exception of your statement:

"We are moving through the new deal toward self-control."

It appears to the writer that for years past industry in general has been losing its self-control and is now headed toward Government control.

We sincerely hope that your efforts toward abolishment of obsolete legislation will be successful.

A. G. Fish, President,
Midwest Steel & Iron Works Co., Denver.

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I HAVE never been able to see any necessity for, or justice in, the Sherman and Clayton anti-trust laws.

They always seemed to me to be aimed at a bogey-man, where none existed.

Ever-changing conditions cannot be helped indefinitely by never-changing laws—look at what happened to the Medes and Persians.

It is quite easy to enact laws in this country—if it were only possible to repeal them as easily, after time has demonstrated their unfitness, we would all be better off.

Wheeler Lord, President,
Nicetown Plate Washer Co., Philadelphia.

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FOR some years past, it has been evident to me that industry has been badly hampered and restricted by the operation of the various "restraint of trade" laws in any effort it might make to correct the evils of destructive competition which have constantly increased. Regardless of any merit or value these laws may have possessed many years ago, they are obsolete today and operate as a barrier to any effective cooperation on the part of industry to stabilize production, wages or prices.

I am heartily in favor of the amendment of these laws in such manner as will make them a help instead of a hindrance to business conditions of this day and age.

Leroy Brooks, Jr., President,
Tool Steel Gear & Pinion Co., Cincinnati.

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CUT-THROAT competition has been going on in the steel industry too long. If some modification of the "anti-trust" laws cannot be made to correct this, then the Government should step in and force those in the industry to sell their finished products at a profit. By profit is meant, fair labor scale, full overhead, fair prices for raw materials plus a reasonable profit.

Prices, especially in the fabricating industry at the present time, are ruinous and should not be permitted to go on, any more than should bread be sold for one cent per loaf.

H. A. Burkhardt, President,
The E. Burkhardt & Sons Steel & Iron Works Co., Denver.

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AT no time, in my thirty years' experience in the iron and steel foundry business, has strict attention to costs and small details effecting economies been so paramount. In spite of this there are but few plants fortunate enough to keep in the black.

Most manufacturers throughout the country in their particular line have about the same cost when not burdened with excessive overhead.

Manufacturers in their associations do talk costs but are reluctant to talk, and adjust prices in accordance with them, for fear of having the backbone of the industry thrown in the penitentiary. They must watch their business either facing severe financial handicaps or going into the receivers' hands and, what makes matters worse, they face competition from plants bought up at ten cents on the dollar. If manufacturers, through their associations, can talk and adjust prices, destructive practices would be greatly reduced.

We have hopes that the new administration will see to it that industry can function without fear.

Lloyd D. Kay, President,
Kay-Brunner Steel Products, Inc.,
Los Angeles.

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COMPETITION, the life of trade, is worthy of recognition, provided competition is fair. Unfair (below cost) trading reduces wage earnings, buying power, freight rates, increases taxes and often compels the manufacturer to branch into other lines, thus making all suffer.

In my opinion both political parties overlooked one of the greatest curses in not making their platform cover the repeal of the antiquated Sherman law.

John T. Llewellyn, President,
Chicago Malleable Castings Co.
Allied Steel Castings Co., Chicago.

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THE writer is a Canadian and it would, therefore, be presumptuous to comment on the laws of your country. However, from the little experience I have had in your country, I do know that any modification that can be made in the Sherman and Clayton acts, which will enable industry to safeguard its capital and give employment and make a reasonable profit so that it will again be able to pay taxes to the Government and help to liquidate the enormous debts all

governments have at this time, will be of great help to all your citizens.

E. E. H. Wright, President,
Welland Vale Mfg. Co., Ltd.,
St. Catharines, Ont.

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THE only possible method by which manufacturers, with good intentions, can protect their employees against unscrupulous manufacturers and those who do not recognize common commercial sense in the operation of their business is through the modification of the anti-trust laws to the extent that manufacturers are permitted to gather and enter into firm, written, signed contracts covering the sale of their products, and with the support of the Government back of them and with a necessary means of controlling those who do not wish to be controlled.

I have had no different views in this connection for the last twenty years, even up to the point if it becomes necessary of the enforcing of this law, rule or regulation, that those who do not wish to participate will be denied the use of the United States mails.

C. A. Owens, President,
The Commercial Steel Casting Co.,
Marion, Ohio.

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TIMES are changing rapidly. It seems certain to me that the Sherman and Clayton acts are working an unnecessary hardship on struggling industry. We are in hearty accord with any well-regulated movement to remove these hampering restrictions.

A. A. Kramer, President,
Columbian Steel Tank Co., Kansas City, Mo.

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THE Sherman and other "restraint of trade" acts probably served their purpose in the "Horse and Buggy Age," but these laws have become obsolete and absolutely impossible in the "Automobile Age" and should be repealed now at the dawn of the "New Deal." The automobile has taught us all to think and work quicker, but no harder, thus making us "Technical Minded." The result has been the enormous development of automatic machinery, thereby causing unemployment by the millions. Now, our big job is to get the unemployed back to work at fair wages by stabilizing industry through the "New Deal" rather than the "Sherman act."

Paul E. Heller, President,
Heller Brothers Co., Newark, N. J.

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THERE is no question that the business situation demands a radical modification of the anti-trust laws. At the present writing there would appear to be no doubt that such a change is imminent. I am convinced that the people as a whole have reached the definite opinion that prices have gone too low and that there is no hope for permanent recovery until they move upward. They are entirely ready for legislation to achieve this end if it is not possible to accomplish in other ways.

Howard Coonley, President,
Walworth Co., New York.

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MY own feeling is that the die is already cast with reference to the anti-trust laws.

During the next few years we will work out in practice the solution to the problem, and in the meantime I am opposed to agitating the subject in such a way as to get the national legislative bodies into a tangle, such as would result from a partisan consideration of the subject at this time.

My feeling is that the things which will take place in the next few years will be entirely sufficient to show the way and shape the legislation which will do away with these restrictions, unless industry should get too ambitious in the meantime and definitely prove to everybody that these restrictive laws are necessary despite their inconvenience.

W. D. Moore, President,
American Cast Iron Pipe Co.,
Birmingham, Ala.

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THE Sherman act was passed to eliminate a great many abuses that had crept into the conduct of big business associations for the purpose of obtaining advantages and privileges not enjoyed by those out of their particular association. These abuses became so manifest that it was difficult for small business to compete and it was considered a very necessary and constructive measure at the time it was passed and I personally can see no reason for changing it at this time.

Since the passage of this law, most public service corporations and other non-competitive organizations have been put under public service controls or commissions to prevent any abuses creeping into the conduct of their business and to insure a reasonable charge for the service rendered and in a similar way to see that they were assured a reasonable rate on their investment.

Unfortunately this control did not go far enough to prevent the exploitations of the investing public by ruthless issuing houses so that even this control is still very far from being effective and what it should be.

Both the Sherman act, i.e., the anti-trust law, and the control of utilities, were certainly constructive and intended for the best interests of the majority of the people and it seems to me that a great mistake would be made to let down the bars and permit a recurrence of the abuses which brought about this very necessary legislation.

Since the war for hypocrisy, during which men were trained to lie and steal and do everything contrary to the doctrines of Christianity, big business men have become more ruthless than ever in their greed for control and power, as is evidenced by recent disclosures.

All indications point that greater restrictions should be placed on big business rather than to let down the bars and thus prevent the exploitations which certainly would be the case if the Sherman law were eliminated and big business men were permitted to run riot at this time without limitations or control.

The present world situation was brought about entirely by the greed of organized swindlers who had boosted prices of stock and all commodities while they held them and then unloaded them on a gullible public who were left holding an empty bag. This happened not only in this country but earlier in England, France and Germany. The latter country particularly suffers a great deal more from these internal swindlers than they suffered from their betrayal by President Wilson with his offering of 14 points.

During this boom time, there was no question about the stability of the gold standard and it would have been more logical to change the gold yardstick during this boom than it is now as that was the period of disturbance and inflation of values. Present prices of all commodities are about what they were in 1910 to 1914 and there certainly was no thought of changing the gold standard at that time.

Anyone familiar with the conduct of financial institutions cannot but suspect that the present embargo on gold and attempt to disturb the financial yardstick is deliberately planned to profit some few who undoubtedly have gold cached in Europe at the expense of the rest of the people just as did the objects of Hitler's prejudices after the war in Germany.

It is the writer's belief that what this country and the world needs is not only a graduated income tax but a classified income tax where the income from illegal or any swindling enterprises would be confiscated and where the tax rates would be regulated in accordance with the merit of a particular source of income. Any business which was non-competitive and which was assured a resaonable return on an investment should be permitted the retention of only a reasonable return on the investment. Similarly business which has and insists on tariff protection should also only be permitted a reasonable return.

Newspapers and periodicals, which have postal and other privileges, should be similarly taxed so that it would be very unprofitable for anyone

to expect special privileges, legislation or consideration.

Most of the price cutting in certain industries is due entirely to over-expansion in that particular industry; where factories were started not because they were necessary but because promoters were able to get credit from fool bankers eager to lend money in order to take advantage of their pet Federal Reserve Act, which enabled them to loan many times as much as they had a right to or which would have been possible to loan had not this law been passed and which proved a boomerang to its originators.

What this country needs is more restriction and more control and an income tax based on net worth, impossible to evade; in other words, compulsory honesty.

The people who read the "Iron Age" are mostly manufacturers who have been in the habit of giving their customers from 100 to 200 cents worth of value for every dollar that they get and anyone who does this should be entirely too proud to have his particular business associated with bankers, brokers, real estate promoters, stock promoters or other parasites, whose victims very seldom get anything at all for their investment.

Legitimate manufacturers and business men need no special privileges. They are basically sound and honest and they should separate themselves from trade associations where a parasitical class uses them for their own rotten purposes.

Manufacturers have enormous plants and pay big taxes to a community whether they are making money or not. They employ most of the workers and usually work on a very small margin in order to keep their plants going and are in an entirely different class from the number of so-called "Business Associations" who are out only for huge profits and very little returns.

It is to the interest of the manufacturers to keep commerce just as clean as they must necessarily keep their own businesses. Those that want the Sherman act repealed are big swindlers in oil, railroads, public utilities and other enterprises where the honest men are to be further swindled.

Geo. J. Meyer, President,
Geo. J. Meyer Mfg. Co., Milwaukee.

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YOUR editorial in the May 18 issue is very much to the point. From time to time in order to meet changing conditions it is necessary to set up new economic patterns.

Human nature is unfortunately trying always to seek some advantage, disregarding the fact that the more we consider the other man's problem the better our own problems are solved.

In order to correct what seemed economic abuses the Government considered it necessary some years ago to press certain laws, known as the Sherman and Clayton Acts, which while perhaps correcting the alleged abuses, no longer fit the present pattern and should be modified or repealed.

In planning for the future, it is necessary to budget labor as well as the other elements of cost. A set up of costs based entirely on hourly rates of labor will not restore satisfactory conditions unless the budget contemplates the maximum employment of labor so as to provide a consuming public with the ability to purchase.

Many of our important industries are hampered by pegged conditions which fit costs but are restricted by law from adjusting prices which will pay fair returns. This is particularly so of the railroad situation.

In the new set-up cognizance should be taken of the fact that living costs have come down and that labor, employed several years ago at costs that made labor-saving machinery a necessity, can now maintain satisfactory living standards at a lower hourly rate, provided the hours of employment are sufficient.

There should be no legal impediment to fixing prices based on fair returns on costs which contemplate a maximum, not a minimum, employment of labor which is economically, not wastefully, employed.

A condition that will for instance enable the dairy farmer to market his entire production of milk and its products would be a start in a basic industry. There is constant demand for milk that is only restricted by the ability and willingness of the consumer to pay. The prices in the large communities are pegged at prices which have so materially curtailed consumption of this necessity that people are not using milk and cream freely. These prices are fixed by agreement based upon duplicating and wasteful methods of distribution and should be revamped to meet conditions of free and fair competition so that laws of a prohibitory or restrictive nature will not be necessary.

Industry in any line should be permitted to adjust its selling price to pay a fair return on costs.

Industry should endeavor to provide employment for as many persons as possible in order to produce a consuming public.

Industry should not be required to meet the prices of the unintelligent or price cutting producer, but if laws are to be enacted they should be such as would not permit sales below productive costs.

Small producers should not be permitted to fix and ruin commodity prices for industry as a whole.

Labor saving devices should be used only to maintain a balance between demand and production on a reasonable basis.

Industry should be given every opportunity to adjust itself to changing conditions free from restrictive or hampering legislation but should at the same time recognize its responsibility to the public and encourage consumption by maintaining fair, not prohibitive, prices.

Laws are passed to correct unfair or corrupt practices and when they are no longer necessary or fail of their purpose should be repealed so as not to be a menace to progress or changed conditions.

E. Haupt, President,
Strobel Construction Co., Chicago.

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I FIRST endorse the very good presentation of the facts in your editorial from THE IRON AGE of May 18, 1933, in reference to the workings of the Sherman Anti-Trust Law as related to the last three or four years. In cycles when the consumption runs ahead of production it is undoubtedly fitting that regulations such as contemplated by the Sherman Anti-Trust and other similar legislations should be operative, because there is some disposition for the manufacturer to exact from the consumer an exorbitant profit and this is undoubtedly a detriment to the welfare of the country as a whole. The opposite condition prevails at a time when production greatly exceeds consumption and the same protection should be accorded by new legislature so that the producer is enabled to maintain a price in keeping with his manufacturing cost and in keeping with the accepted scale of wages in the industry. In order to insure this price being fair and not excessive in any form, government representation should be present at the time of the meeting and the costs investigated and when once a reasonable price is determined in the light of all the circumstances it should be binding upon all those engaged in the industry to observe such figures and the same penalties should be exercised both against the manufacturers violating the agreed price as well as the consumer purchasing anything lower than the agreed price, making both parties liable and subject to fine or imprisonment or both.

The antiquated anti-trust law should be repealed and new legislation incorporating both of the above conditions should be enacted at as early a date as possible.

T. H. McGraw, Jr., President
Braeburn Alloy Steel Corpn., Braeburn, Pa.

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ANTI-TRUST legislation has afforded no relief or assistance during the period of depression. There must be pro-Industry legislation and effort so that there can be recovery and stability. Industry must not only be regulated and controlled but also

properly encouraged. If Industry is properly encouraged, managed, operated and regulated, employees will enjoy suitable hours of employment at satisfactory wages, and will be able to provide sufficiently for that age when they no longer can be actively employed; the customer will receive better product, more uniform in quality, and at a proper price, and with greater assurance as to the continuance and dependence of the source, all of which will be for the public advantage and welfare. Experience has shown that "Anti" efforts lead to destruction and "Pro" efforts to progress and development.

Men under "restraint" cannot do their best. If free to act, men put forth their best efforts and by their accomplishments help others.

Fortunately, a spirit exists today to assist Industry to find its proper way. No one engaged in Industry should in the future destroy this fine cooperate spirit by attempting to obtain any selfish advantage. Every manufacturer should, in the same spirit, carry on with proper consideration for the best interests and welfare of the public. Proper consideration and understanding mean satisfactory experience and make unnecessary legislative efforts that sometimes hamper and destroy.

C. H. Henkel, Receiver,
Empire Steel Corpn., Mansfield, Ohio.

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THE question of the necessity for an adjustment of the old Sherman and Clayton Acts is really not a debatable one at this time.

The argument in favor of such a modification is all on one side. Any sane business man knows that a law enacted 43 years ago cannot possibly meet conditions in industry as they exist today. A new deal is necessary, and I am sure that we are going to get it.

These antiquated laws will, I am sure, be modified to meet present conditions and those of the immediate future. The sooner this is done the sooner there will be a revival in business.

G. F. Ziv, President,
Ziv Steel & Wire Co., Chicago.

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I NATURALLY agree with what you have said for the reason that in February of last year, in company with some 117 executives from all over the country, we presented a memorial to President Hoover on this very subject. It was admirably phrased by the late Malcolm Whitman, with such modifications as appeared advisable to the rest of the executives attending this conference.

It was agreed by everyone that something must be done to lead us out of the jungle tactics now destroying the industry, and that selling a product of industry below cost is doing more harm to the country in general under the Sherman law and Clayton Acts than could possibly result from a moratorium modification or repeal of the said legislation.

The difficulty we experienced regarding the problem was how to discipline the recalcitrant individual who refuses to belong to any organization, and who believed that his success or money making ability could only be maintained by an orgy of self-destructive competition, with little or no regard as to cost, letting alone overhead or profit.

In 1890 the Sherman law and Clayton Act was, I believe, designed primarily to protect the public, but would now seem by 1933 these very acts are destroying the public and the small manufacturer, and that as you very fittingly put it, this legislation is now outmoded and decrepit.

W. Nelson Mayhew, President
Montgomery Iron & Steel Co., Philadelphia

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A SMALL industry like ours wonders whether it will receive sufficient benefits by having the Bill to encourage National Industrial Recovery to help produce black ink figures. The ruthless competition among the small manufacturers like ours has brought many of them to where they have almost reached the point of quitting. While we have not read a copy of the Bill, it appears to be most drastic and revolutionary.

We are very much interested in the plan, especially as regards price fixing and price raising, which will give better and more employment to labor. Many of the small concerns like ours do not have trade associations, and we are wondering how they can arrange to get together to see what can be done to raise wages, cut down working hours, raise prices by agreement so as to produce a profit and agree not to sell below their cost, but we presume that the Bill will provide so that the minority can be curbed on this cut-throat competition.

We believe, however, that it would be well for us to have faith in the Bill and to ask our Congressmen and Senators to help an early passage of it. It certainly could not bring any worse conditions than exist at the present time.

Chas. Pasche, President,
Davenport Locomotive & Mfg. Corpn.,
Davenport, Iowa

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A FEW years ago a man who knew nothing or cared nothing about cost and made his prices ridiculously low was considered the balance wheel or safety valve to protect buyers. So much business was being placed that the little which he obtained did no serious damage. If he obtained too much it automatically ruined him or forced him to a reasonable price standard.

Today the share which this man gets may not only ruin himself, but tends to wreck the whole industry. Unquestionably industry should not be hampered by law in any effort to reasonably control such destructive agencies. We know that any unreasonable control, defying the natural economic laws, will work its own destruction; every effort to peg the price of rubber, wheat, cotton, or any other commodity at prices above the proper economic level has defeated itself. Efforts, however, should not be hampered that tend to restrain a vicious, unintelligent, and uneconomic breaking down of a normal and fair price level.

E. S. Sawtelle, President,
The Sawbrook Steel Castings Co.,
Lockland, Ohio

Also Chairman of the Commercial Standards Com. American Gear Manufacturers Association.

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THE editorial appearing in the current issue of THE IRON AGE, relating to the proposed modification of the "Anti-trust" laws, is both timely and sound. The almost unanimous opinion among students of the economic situation is that the so-called "Restraint of Trade" Acts have become obsolete in the light of changed conditions. Under these circumstances, these Acts should be so modified as to make them helpful instead of destructive in their effect upon the present situation.

Otto H. Falk, Chairman,
Allis-Chalmers Manufacturing Co.,
Milwaukee, Wis.

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IT seems to me that the destructive competition, which has been so widespread during the past several years, in the steel industry makes it plain to any thinking mind that the country's welfare would be greatly benefited by a decided easing up in the "anti-trust" laws.

With the many companies engaged in making steel there will always be a sufficient amount of competition.

F. Wilckes, President,
The Athenia Steel Co.
New York.

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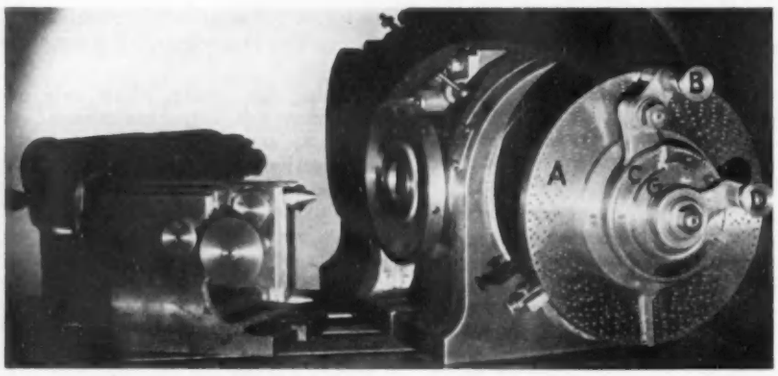
I HEARTILY agree with the editorial appearing in your issue of May 18. This surely is the time to reconstruct such existing acts as have contributed so much toward the downfall of industry and the disastrous competition that has brought so many manufacturers to the verge of bankruptcy.

Geo. T. Ladd, President,
United Engineering & Foundry Co.,
Pittsburgh



Wide-Range Device for Cincinnati Dividing Heads

THE "wide-range divider" recently brought out by the Cincinnati Milling Machine Co., Cincinnati, for use with its universal dividing heads, permits rapid selection of divisions from 2 to 400,000 and of any angle in degrees, minutes and seconds. Any of the divisions or angles can be obtained with the dividing head spindle set at any angle from 10 deg. below the horizontal to 50 deg. beyond the vertical, for example, when cutting bevel gears. Spiral gears can also be indexed.

The new device is a compact, self-contained unit, built into the dividing head, consists of the large index plate, *A*, sector and crank, *B*, together with a small index plate, *C*, and sector and crank, *D*. The small crank *D* operates through reduction gearing of 100 to 1 ratio inclosed in the housing *G*. Ratio between the dividing head worm-shaft and spindle is 40 to 1.

This new divider can be set up for universal indexing in the conventional manner by utilizing crank *B* only, in combination with the proper hole circle on the large plate. When the number of divisions required cannot be obtained by conventional indexing method, the wide-range divider is employed.

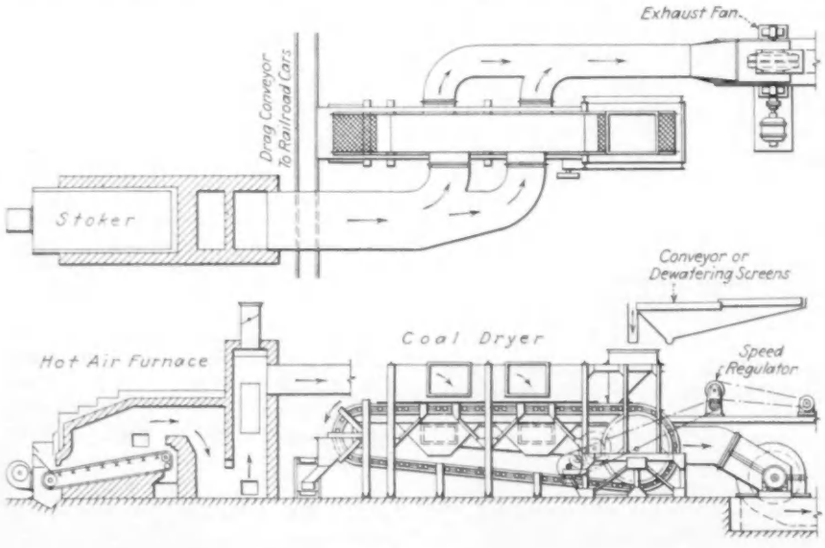
Ability to select any desired angle in degrees, minutes or seconds is particularly valuable in the toolroom for spacing keyways and slots or when boring holes in angular relation to each other. The 54-hole circle in the large plate *A* and 100-hole circle in the small plate *C* are employed. One turn of the large crank *B* equals 9 deg., one space on the 54-hole circle equals 10 min., one space on the small plate *C* equals 0.1 min. or 6 sec. Ten spaces on the small plate equal 1 min.

Cincinnati dividing heads already installed in the field can be equipped with the wide-range divider.

Dwight Lloyd Oliver Dryer

A NEW dryer, known as the Dwight Lloyd Oliver, or for short the D L O dryer, built by the Sintering Machinery Corpn., is offered by the Oliver United Filters, Inc., 33 West Forty-second Street, New York. The accompanying sketch shows the relation of the dryer to the source of heat and the source of the vacuum, namely, a rotary fan.

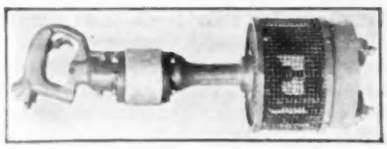
Operating on the principle of a straight-line traveling bed, the wet material is dried by the controlled passage through it of heated air or gases. Low power consumption is emphasized and the claim is also made of low fuel rates, because of the economical method of applying heat.



External Tube-End Polisher

COST reductions as compared with cost of hand filing and polishing boiler tubes are claimed for the new rotary-driven pneumatic external tube-end polisher recently brought out by the Chicago Pneumatic Tool Co., 6 East Forty-fourth Street, New York. The tube capacity is 3 to 4 in., outside diameter.

The machine is light in weight and is easily handled. It is equipped with a heavy-duty power vane motor, a closed handle with safety throttle, and a safety screen. Emery sticks



are easy to remove and replace. Pilots are adjustable and bear on the outside diameter. Operation is automatic. Variation in tube wall does not affect the finished job, and ends may be polished in stacks without moving the tubes. The length overall is 26 in., and the weight 24 lb. net.

New Bakelite Molding Material

THE Bakelite Corpn., 247 Park Avenue, New York, has developed an "impact" molding material said to have several times the shock resistance of ordinary molding material, such as used for bottle caps, switch-plates, pencils and the like. It consists of fibrous materials processed with Bakelite resinoid, and although similar in many respects to the Bakelite laminated products, it differs in that it can be molded and is therefore adaptable to a wide range of shapes. This new product was developed for parts subjected to hard knocks and rough service, such as the heads of golf clubs, covers of ledgers, handles and knobs and similar parts. It is also suitable for camera cases, because in addition to high mechanical strength, the material is light in weight. Attractive surface finish is also a feature.

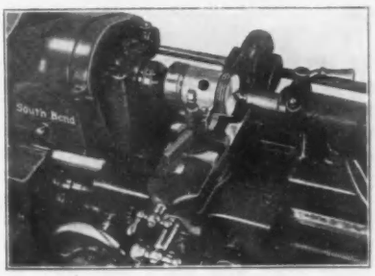
Central Foundry Co. announces that the Chicago sales office of its Universal Pipe Division is now located at 1629 Wellington Street, corner Paulina Street.

Builds Lathes for Finishing Cam-Shaped Pistons

A CAM piston finishing lathe designed to machine both round and out-of-round automotive engine pistons has been brought out by the South Bend Lathe Works, South Bend, Ind. The machine can be set up quickly to finish pistons of practically any diameter, material or shape, straight or tapered types.

The machine illustrated consists of a 13-in. underneath-belt motor-driven lathe with a cam forming unit mounted on the lathe carriage at the rear of the saddle. This cam forming unit is geared to the lathe spindle so that as the spindle rotates, it revolves the master cam. The cam oscillates the tool-slide according to its throw, and thus turns the skirt of the piston to the shape desired.

Cemented-carbide tools are used. With light cuts and fine feeds, and relatively high speeds, an unusually smooth surface is produced on the skirt of the piston and a highly polished surface on alloy pistons. Up to 25 sets of six pistons can be machined per day. These lathes are available in three sizes, for the small, medium and large shop.

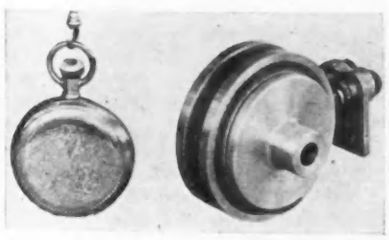


Both round and cam-shaped pistons may be set up and machined rapidly. Cemented-carbide tools assure smooth finish.

MagneticClutchMeasures Only 3 In. in Diameter

WITH a diameter of only 3 in., the magnetic clutch illustrated is believed to be the smallest ever built. It was developed by the Magnetic Mfg. Co., Milwaukee, and has been made a standard part of the company's Stearns high-duty magnetic clutch line, which includes units of all sizes in single and multiple-disk construction.

This clutch weighs but 3½ lb. and is only 3 in. long, overall. It is of



simple and rugged design and can be used on any drive requiring automatic or manual clutching. The collector rings are mounted on the outside diameter to conserve space on the shaft, but they can be placed on a hub extension of the field member, if desired. A standard brush holder assembly is included.

A feature emphasized is that the clutch will develop a torque equivalent to 40 in.-lb. for continuous-duty operation and only requires 15 watts direct current to energize it. For intermittent service considerably higher torques can be obtained, depending upon the number of operations per minute and the length of time on and off. Where d.c. of the proper voltage is not available, the clutch can be energized from a 110-volt alternating current circuit through use of a small rectifier designed for this application.

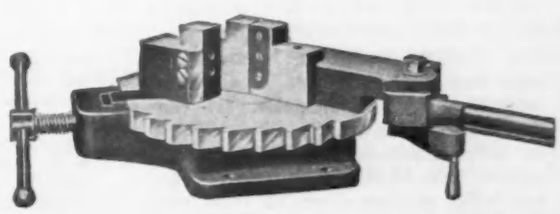
Hand Bender for Small Shapes and Tubing

THE Sampson Tool Co., 101 Walker Street, New York, has placed on the market the universal bending machine illustrated, designed for the rapid and accurate bending of flats, squares, rounds, angles, tees, profile iron and tubing to any angle down to 60 deg.

The tool is operated by a short hand-lever and ratchet, but can be used without the ratchet when bending light-gage materials. Bending blocks are of hardened steel and are interchangeable. Special blocks can be furnished for bending small squares, angles and T-iron to sharp angles or angles with a radius.

Maximum capacity when bending cold is: Flats, 2½ x 5/16 in.; rounds and squares, ⅜ in.; angles, 2¾ x 5/16 in.; tees, 1½ x 3/16 in.; and tubing ¾ in. Capacity when bending hot: flats, 3½ x ⅝ in.; rounds and squares, 1 3/16 in.; angles, 3½ x ⅝ in.; and tubing, 1 in.

Flats, squares, rounds, angles, tees and tubing may be bent to any angle down to 60 deg.



Sensitized Paper for X-Ray Testing

The St. John X-Ray Service Corpn., New York, has developed a new X-ray paper to replace the more costly film previously used in industrial and metallurgical X-ray work. The new paper is claimed to have many advantages over the celluloid film. Its price is less than that of the film and it is said to be easier to handle, to dry faster, and yet to be as fast in exposure as film and to give as much contrast. With it a 2 per cent marker is readily recognizable. The usual practice is to expose simultaneously two sheets in one cassette. In this way it is possible to retain one negative and to ship the other with the product tested.

Totally inclosed motors for damper regulators or for turning on and off fuel-air valves, combining the gear train and switching mechanism within the housing, are made by the Minneapolis-Honeywell Regulator Co., Minneapolis. These small power units are inherently electric-motor-driven speed reducers and are for use in conjunction with the Minneapolis-Honeywell and other controlling devices. They are made in the reversing and non-reversing types, for alternating or direct current, and for such requirements as on-and-off, or high-and-low controls, and three position, so-called floating and proportioning uses.

Special Bar Iron for Severe Vibration Service

A special grade of bar iron, designated as Nordic iron, for service where extremely sévere vibration is encountered has been announced by the Reading Iron Co., 401 North Broad Street, Philadelphia.

The structure shown by fracture is of fibrous appearance characteristic of wrought iron. By virtue of this structure, a bar of Nordic iron is said to react to vibrational stresses like a closely knit bundle of individual wires rather than a solid bar, and for this reason possesses very high resistance to failure due to vibration and fatigue. Another important characteristic is resistance to impact or shock resulting from a sudden blow or suddenly applied load, as in electric street railway or coal mine equipment.

Nordic iron is said to possess not only the same toughness and ductility of Swedish iron, but in addition has a greater tensile strength. Average results of tensile tests are: Ultimate strength, 48,930 lb. per sq. in.; yield point, 30,120 lb. per sq. in.; elongation in 8 in., 34.6 per cent; and reduction of area, 62.7 per cent. The iron is said to bend cold or hot equally as well as the Swedish iron, has free welding qualities, and ability to stand without damage temperatures several hundred degrees higher than can be employed in heating and welding steel bars.

Distribution Cost Study Available

Figures on the relation of manufacturers' distribution costs to sales volume are now available for 29 leading industries of the country as a result of a study just completed by the Association of National Advertisers, 330 W. 42nd St., New York, with the cooperation of the National Association of Cost Accountants.

The report, containing 109 pages, presents data on 1931 expenditures and 1932 budgets of 312 manufacturers with an aggregate sales volume in 1931 of more than one billion dollars. It is divided into two parts, the first of which is devoted to an analysis of the cost of distributing Consumer Products, such as food, wearing apparel and home furnishings, and the second part to Industrial Products, such as materials and supplies in building construction and products sold to other manufacturers.

A wide variation is reported in some cases in the cost of distribution between different industries. In the Consumer Groups, the relation of total distribution costs to sales volume ranged from 38.80 per cent for drugs and toilet articles down to 16.54 per cent for radio equipment and supplies, while in the Industrial Groups these percentages ranged from 25.83 per cent for machinery and machine tools down to 9.15 per cent for textiles, the lowest figure for any group average.

The Industrial Groups which make up the second part of the report include: building materials and supplies, chemicals and allied products, electrical equipment and supplies, iron and steel and their products (not including machinery), machinery and machine tools (not including transportation equipment), non-ferrous metals, paper and paper products, stone, clay and glass products, textiles, and transportation equipment.

A limited number of copies of "An Analysis of the Distribution Costs of 312 Manufacturers" is available for sale outside the A.N.A. membership it was announced, at the price of $15 each.

Advisory Board Appointed By Construction Institute

The American Institute of Steel Construction announces the appointment of a Technical Advisory Board comprised of engineers of recognized authority to act in an advisory capacity on all its research and technical standards.

During the past ten years the Institute has endeavored to promote a coordination of the architectural and engineering technical requirements for structural steel with industrial standards and economics in the public interest. Much success along these lines has already been attained, and it is desired to have this work continued under the guidance of an Advisory Board that will keep the standards abreast of new and improving conditions.

The personnel who have accepted appointments on the Technical Advisory Board follows:

H. G. Balcom, Consulting Engineer, 10 East 47th Street, New York City.

Paul A. Blackwell, Chief Engineer, Virginia Bridge & Iron Co., Roanoke, Va.

G. H. Danforth, Contracting Engineer, Jones & Laughlin Steel Corporation, Pittsburgh, Pa.

Donald Derickson, Professor of Civil Engineering, Tulane University, New Orleans, La.

A. R. Ellis, Pittsburgh Testing Laboratory, Pittsburgh, Pa.

V. E. Ellstrom, Manager of Sales Engineering, Bethlehem Steel Co., Bethlehem, Pa.

J. E. Greiner, Consulting Engineer, The J. E. Greiner Co., Baltimore, Md.

O. L. Grover, Senior Highway Bridge Engineer, Bureau of Public Roads, Washington, D. C.

Magnus Gundersen, Chief Structural Engineer, Graham, Anderson, Probst & White, Chicago, Ill.

Paul E. Jeffers, Consulting Engineer, 816 West Fifth Street, Los Angeles, Cal.

Jonathan Jones, Chief Engineer, McClintic-Marshall Corporation, Bethlehem, Pa.

Philip G. Laurson, Professor, Engineering Mechanics, Yale University, New Haven, Conn.

B. R. Leffler, Engineer of Bridges, New York Central Railroad Co., Cleveland, Ohio.

Robert A. Marble, Structural Engineer, Carnegie Steel Co., Pittsburgh, Pa.

H. H. Morgan, Robert W. Hunt Company, Chicago, Ill.

Clyde T. Morris, Professor, Structural Engineering, Ohio State University, Columbus, Ohio.

L. E. Ritter, Consulting Engineer, 140 South Dearborn Street, Chicago, Ill.

Joseph G. Shryock, Chief Engineer, Belmont Iron Works, Philadelphia, Pa.

W. W. Smith, Sales Engineer, Inland Steel Company, Chicago, Ill.

C. H. Snyder, Consulting Engineer, 251 Kearny Street, San Francisco, Cal.

W. C. Spiker, Consulting Engineer, Atlanta, Ga.

D. B. Steinman, Consulting Engineer, Robinson & Steinman, New York City.

F. E. Turneaure, Dean, College of Mechanics and Engineering, University of Wisconsin, Madison, Wis.

Wilbur J. Watson, Consulting Engineer, Wilbur Watson & Associates, Cleveland, Ohio.

A. R. Wilson, Engineer of Bridges and Buildings, Pennsylvania Railroad Co., Philadelphia, Pa.

Richard Khuen, Jr., Chief Engineer, American Bridge Co., Pittsburgh, Pa.

Industrial Output as a Measure of Depressions

Steel ingot production in 1932 was 76 per cent below that of 1929, while industrial production showed a decline of only 47 per cent, said J. F. Dewhurst, economist for the American Iron and Steel Institute, New York, in a recent address at Lexington, Ky., at the fifteenth annual meeting of the American Association of Collegiate Schools of Business. Although industrial production has declined less during the depression than steel output, it has fallen off much more than it did in previous depressions. The decline in industrial production from 1920 to 1921 was only 23 per cent. In the severe depression of the 70's the recession was 10 per cent, and in the 90's, only 7 per cent.

Mr. Dewhurst pointed out that industries engaged in producing nondurable and consumptive goods have fared much better during the depression than the construction and durable industries.

Doehler Die Casting Co., New York, will move its main executive offices, including the office of H. H. Doehler, president, and that of F. J. Koegler, vice-president and treasurer, to Toledo, Ohio, effective June 1. A New York sales office, under the management of L. H. Pillion, vice-president and Eastern sales manager, will be maintained at the company's old address, 386 Fourth Avenue, New York.

OFF THE ASSEMBLY LINE

Motor Car Companies Raise Wages, Plan Expansion As Brisk Sales Continue

DETROIT, June 6.

THAT the automobile industry is convinced that better times are in the offing and that it is eager to do its part to contribute to national recovery was evidenced by developments the past week. Announcement by General Motors of an increase of 5 per cent in wages of its 100,000 workers is considered the forerunner of similar action by other companies. Cord Corpn., of which Auburn is a subsidiary, already had advanced the wages of its employees 5 per cent. It also became known during the week that one of the leading motor car manufacturers, which has met with unusual success recently, is contemplating expansion of its production facilities. This is likely to result in capital expenditures of considerable proportions in the near future.

Despite the fact that May's assemblies were the largest of any month since July, 1931, in some cases retail sales outdistanced output. It is said that Chevrolet's domestic retail deliveries, for example, exceeded 64,000 units, while production was nearer 62,000. Thus the month showed an actual reduction in dealers' stocks. There has been a continuation of the broadening of retail demand, particularly in the Middle West and South, where prices of farm products have soared in recent weeks. Sales executives are convinced that retail buying will be maintained at a fairly good level during the next 90 days, although a seasonal tapering seems inevitable. If May took production up to or above the 210,000 mark, June probably will see a recession to about 190,000 units. July is a little far away as yet to hazard a reliable estimate, but observers are looking for assemblies then of 160,000 cars.

Official figures reveal that in the first four months of this year production in the United States and Canada amounted to 557,033 cars. With a conservative 210,000 units allotted to May and 190,000 to June, the first half of 1932 should have total assemblies of at least 957,033 units, compared with 911,092 in the same period of last year. One should bear in mind the fact that the 1932 figures included the period when manufacture of the Ford V-eight was at its peak. Automotive executives are looking forward to a rapid widening of the gap between this year's and last year's production during the last six months of 1933. In 1932, the last half yielded a bare 521,074 units, hardly a subsistence level for the industry; even with bad luck this year's record should surpass that figure by a substantial margin.

Gain Is in Passenger Cars

It is notable that the gain this year as against 1932 has been entirely in passenger cars. In the first four months passenger car assemblies showed an increase of 9 per cent, whereas truck output fell off 11 per cent. As the full impetus of the revival of the brewing industry is felt and as fleet owners begin again to replace obsolescent vehicles, it is believed that the truck division of the industry may wipe out its loss and in the latter part of the year become one of the chief supports of manufacturing activities.

The absence of talk about new models, except in connection with Mr. Ford's proposed model 44, is an indication that the industry is well satisfied with the course taken by production and sales and is willing to let well enough alone and to get a welcome breathing spell before making further outlays for tooling up for new models. Mr. Chrysler recently stated that no essential changes would be made in any of his lines of cars the remainder of the year. It is confidently expected that manufacturers who in the last two years have been inclined to "rush the season" with new models will hold off their 1934 presentations until the January shows, unless business in coming months should take an unanticipated tumble.

Higher retail car prices still are being discussed and their imminence publicized largely for the purpose of trying to drive in more sales. However, actual advances are considered remote; perhaps Mr. Chrysler's statement that prices of the Chrysler and De Soto lines will be lowered is more closely akin to the industry's thinking.

Look for New Ford Oct. 1

From reliable sources comes the information that Mr. Ford has decided that the time will soon be ripe for the presentation of model 44, the long delayed but much talked about model. The date is said to be about Oct. 1. The reasoning behind this decision is somewhat as follows: The farmers will have harvested their crops by then, probably getting the best prices in several years, and will have some money to spend; industrial recovery will be far enough along that workers will have been back at their duties for a sufficient time to have accumulated a down payment for a car; the country will be hungry for a good car at a new low price. There is dispute regarding the car's being a four or an eight. If these plans go through as reported, the Ford company will start placing orders for materials in August. Perhaps this will provide the needed tonnage in steel to take up the slack which usually occurs in automotive releases in August, September and October.

Final figures for Plymouth production in May showed a total of 34,554 units, a gain of 44 per cent over the previous month. Both Pontiac and Oldsmobile have turned out more cars already this year than in the entire year of 1932. Chevrolet has stepped up its schedule for June and will make about 65,000 cars, compared with 70,000 in May. Ford still has 40,000 to 45,000 planned for this month. For the first time since model A was introduced, Ford is having a portion of its cylinder blocks made outside the Rouge plant; Campbell, Wyant & Cannon at Muskegon is

said to have the contract. Ford lost over a million dollars a week in 1932, according to a statement filed in New Hampshire. In the last two years Ford lost over $108,000,000. During the years 1926 to 1932, inclusive, Ford built over 7,500,000 cars and lost approximately $22,000,000, realizing a profit in only three of the seven years. These figures, of course, do not take into account any dividends which the Ford Motor Co. may have paid to its three stockholders—Mr. and Mrs. Ford and Edsel Ford.

Chrysler Corpn. has put out inquiries for steel prices for the third quarter and inquiries from General Motors units are expected this week. The rank and file of steel users are showing concern over the threatened rise in prices and in numerous cases are asking for quotations for the entire last half of the year.

One of the largest automobile companies is considering the feasibility of closing out its various toolrooms, selling the equipment and having its toolroom work done in outside shops. If an affirmative decision is made, it will be a distinct departure from this company's long established practice, but will prove a boon to local tool shops.

Electric refrigeration manufacturers are establishing new production records. Kelvinator shipped 43,357 units in May, shattering all previous monthly totals. Frigidaire Corpn. has the largest schedule in its history for June and is employing 10,000 men at its Dayton, Ohio, plants, the largest number since 1929.

Tin Research and Development Committee Is Formed

THE American Tin Trade Association has formed "The United States Tin Research and Development Committee" with the following membership:

Chairman, James E. Pope, Pope Trading Corpn.; A. B. Hall, National Lead Co.; George A. Biscaye, C. Tennant Sons & Co. of New York; Marshall W. Tuthill, Tuthill & Co., Inc.; and L. J. Tavener, United States representative on the International Tin Research and Development Council.

The membership of the committee will be expanded so that, as finally constituted, it will include other and technical members, representing the research departments of those interested in developing the extension of the use of tin in industry and the arts.

The purposes of the committee are: (1) to expand present uses for tin, (2) to develop new uses, and (3) to preserve and strengthen existing markets where tin meets competition.

In carrying out these purposes the committee will work in close cooperation with the International Tin Research and Development Council, which has instituted an international program of tin research and development.

The American Tin Trade Association has been in existence since 1928 and is composed of active members engaged in business as importers, dealers or brokers in pig tin, and associate members interested in the use and consumption of tin. A. B. Hall of the National Lead Co., is president of the Association. John Hughes, assistant to the president, United States Steel Corpn., is one of the association's directors.

The International Tin Research and Development Council was formed in recognition of the vital need for the development of accurate and comprehensive data concerning the characteristics and industrial applications of tin. It is composed of official delegates appointed by the governments of Bolivia, Nigeria, Dutch East Indies and Malaya.

Through the cooperation of the international council with the United States Tin Research and Development Committee of the American Tin Trade Association it is anticipated that there will be established in or near New York City facilities for the investigation of problems met by tin consumers and the development of suggestions for the solution of such problems or use of tin in industry and the arts.

Steel Corporation Closes Canadian Plant

The Canadian Steel Corpn., subsidiary of the United States Steel Corpn., has stopped operations at its plant at Ojibway, Ontario. Construction of the plant began in 1913 and the facilities there include a wire drawing mill, barbed wire and fence departments, a fence post and gate department and galvanizing and tinning divisions.

The galvanizing and tinning equipment was installed and put into operation in 1930, in the belief that the black sheets for galvanizing and the black plate for tinning would be admitted free from the American plants of the United States Steel Corpn. This belief seemed to be well founded, because in March of the following year Canada, by order in council, announced that sheets for tinning and sheets, hoops, bands and strip steel for galvanizing would be admitted free. However, in June the Canadian Parliament imposed a duty of 10 per cent on these products, effective Sept. 1. Finally in 1932, following the Imperial Conference at Ottawa, the duty on tin mill black plate from the United States was raised from 10 to 15 per cent, while the British preferential duty, which had been 5 per cent, was entirely removed. Similarly, the duty on flat steel for galvanizing from the United States was raised from 10 to 20 per cent, while the British preferential duty remained at 5 per cent.

New Silicon-Carbide Refractory Brick

(*Concluded from Page* 896)

lintels, roof-skews and roof brick. The process time in making the bricks is only three days, so that special shapes can be easily and quickly provided.

The relative cost Mr. Diamond mentions as about 2½ times that of magnesite brick, but by decreasing the thickness of tercod and increasing the thickness of the insulator, the refractory cost can be brought down to about that of the magnesite, and the heat loss reduced in addition.

"Research is now being carried on," he says, "to determine the practicability of facing tercod brick with a fused alumina material in place of the boro-silicate, so that actual contact with steel may be permitted. Tercod crucibles made with a glazed alumina lining have shown excellent life. If it is also practical to face brick shapes with an alumina lining, we may soon offer complete tercod linings for electric steel melting furnaces."

PROPERTIES OF GLAZED (BORO-SILICATE) TERCOD BRICK AND OF SILICA BRICK

	Tercod Brick	Silica Brick
Coef. of thermal expansion per deg. C.	0.0000027	0.000023
Spalling loss, 1350 deg. C., air blast	None in 10 cycles	100 per cent in 4 cycles
Resistance to abrasion at 1350 deg. C. loss, per cent	None	6.1
Porosity, per cent	18	28
Specific gravity, per cent	2.1	2.3
Specific heat, per cent	0.18	0.26

... PERSONALS ...

HENRY G. DALTON, senior partner of Pickands, Mather & Co., Cleveland, celebrated his 50 years of service with that firm at a luncheon given at the Union Club in that city June 2, which was attended by about 75 of the city's industrial and civic leaders and a few business associates from Chicago. A portrait of Mr. Dalton was presented to the club, the presentation speech being made by Newton D. Baker.

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B. F. SHEPHERD, formerly chief metallurgist of the Ingersoll-Rand Co., Phillipsburg, N. J., has been made manager of the rock drill division of the company.

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DR. A. B. KINZEL, chief metallurgist of the Union Carbide & Carbon Research Laboratories, Long Island City, N. Y., left last week on a two months' business trip to England, France and Germany.

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EARL R. WADDELL has been appointed Southern district manager, with offices at 1524 Fair Building, Fort Worth, Texas, of the hoist and crane division of Robbins & Myers Sales, Inc., Springfield, Ohio.

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C. H. WILSON has been made sales representative in the Albany district for the Northern Equipment Co., Erie, Pa. He will make his headquarters at 1403 Park Boulevard, Troy, N. Y.

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Dr. PAUL GIROD, of Girod electric furnace fame, Cannes, France, is making a short visit to the United States.

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L. P. NIESSEN, Cutler-Hammer, Inc., has been elected president, Milwaukee Association of Industrial Advertisers. Other new officers are: Vice-president, J. O. FERCH, Harnischfeger Corpn.; secretary-treasurer, EARL E. LASHWAY, Allis-Chalmers Mfg. Co.; directors, E. J. GOES, National Equipment Co., and A. J. ANDREWS, Bucyrus-Erie Co. The Milwaukee group was organized in 1921 and is affiliated with the National group, of which FORREST U. WEBSTER, advertising manager, Cutler-Hammer, Inc., is president.

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E. F. Houghton & Co., Philadelphia, announces the following changes and promotions in executive personnel:

Louis E. Murphy, president since 1929, continues in that capacity.

Major A. E. Carpenter, first vice-president and treasurer, resigned the latter office and was elected general manager.

George W. Pressell, second vice-president and secretary, resigned the secretaryship and was elected assistant general manager and director of sales.

Dr. R. H. Patch, director of plants, has been elected treasurer.

A. E. Carpenter, 3d, assistant to general sales manager, was elected secretary.

The company also announces the appointment of George S. Rogers, formerly assistant general sales manager in charge of the St. Louis and Chicago offices, as general sales manager with headquarters in Philadelphia.

Sales for the month of May, 1933, were reported the highest in over a year, being 24.5 per cent above those of the same month in 1932.

... OBITUARY ...

CHARLES W. SCOFIELD, for many years secretary and treasurer of the Lake Erie Iron Co., Cleveland, died May 29, aged 83 years. He was associated with that company from 1871 until about 1917. The Lake Erie Iron Co., which operated a rolling mill and manufactured bolts and nuts, later was taken over by the Lake Erie Bolt & Nut Co. and the plant was acquired a few years ago by the Lamson & Sessions Co., Cleveland. Mr. Scofield retired from active business 15 years ago.

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ALLAN M. FOSTER, formerly president of the Foster Bolt & Nut Mfg. Co., Cleveland, which he organized in 1909, died May 31. His company was merged with the Lamson & Sessions Co. in 1930 when Mr. Foster retired from active business. He was a native of Newcastle, Ontario, and lived in Rochester and Buffalo for some time before locating in Cleveland.

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J. STUART EVANS, president, Diamond Tool & Engineering Co., Detroit, died on May 27 after a short illness. He was 48 years of age.

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E. E. GUNTERT, representative of the Goddard & Goddard Co. in the greater part of New York, died at his home in Rochester on May 16.

St. Louis Gas & Coke in Receivership

The St. Louis Gas & Coke Corpn., Granite City, Ill., with two blast furnaces and a by-product coke plant, has been put into receivership.

George B. Evans, former president of Laclede Gas Light Co. was named receiver by Federal Judge Louis Fitz-Henry, Springfield, Ill. Application for a receiver was filed by the Illinois & Missouri Pipe Line Co., which, like the St. Louis Gas & Coke Corpn., is a subsidiary of the Utilities Power & Light Corpn., of Chicago.

Last Minute Sales Leads

(Received too late for classification in our Plant Expansion Section)

Stanley Works, New Britain, Conn., will begin superstructure for new one-story forging mill, 63 x 102 ft., for which contract recently was let to Berlin Construction Co., Depot Road, Kensington, Berlin, Conn. Cost about $35,000 with equipment.

City Council, Rockford, Iowa, asks bids until June 27 for equipment for a municipal electric light and power plant, including 375-hp. Diesel engine generator set and complete accessories, switchboard, etc., and electric distribution system. Fund of $105,000 has been voted for work. H. L. Cory Co., Redick Tower, Omaha, Neb., is consulting engineer.

Board of District Commissioners, District Building, Washington, asks bids until June 16 for one 10,000 lb. main hoist electric traveling crane.

Charles A. Brady, 435 Forty-second Avenue, San Francisco, engineer, has plans for new multi-story brewery at Pennsylvania and Army Streets, for company being organized by Thomas W. Costello, San Francisco, and associates, to include bottling works, mechanical-cooling division, boiler house and machine shop. Cost over $500,000 with equipment. Proposed to build a winery on adjoining site later, to cost close to $350,000 with machinery.

Gulf Refining Co., 17 Battery Place, New York, has secured permit for new bulk oil storage and distributing plant at Fort Pierce, Fla., with tank capacity of 275,000 gal. Cost about $60,000 with steel tanks and other equipment.

Signal Supply Officer, Army Base, Brooklyn, asks bids until June 12 for 116 miles of galvanized wire (Proposal 128).

White Fuel Corpn., 888 East First Street, South Boston, will soon take bids for new mechanical coaling-handling plant. Cost about $70,000 with equipment. George P. Carver, 62 Dane Street, Beverly, Mass., is architect and engineer.

Director of Business Control, Olaf Olson, Capitol Building, Olympia, Wash., will take bids about June 15 for new power plant at State prison, Walla Walla, Wash. Cost over $45,000 with equipment. George M. Rasque, Spokane Savings Bank Building, Spokane, Wash., is architect.

Silver Foam Brewing Co., Grand Rapids, Mich., Casper Haehnle, president, plans erection of new multi-story plant, consisting of several units, and including a one-story boiler house. Cost over $200,000 with equipment.

United States Engineer Office, Milwaukee, asks bids until June 12 for 2648 lin. ft. lap-welded, charcoal iron boiler tubes (Circular 261).

Trade Associations Organize for Activity Under Control Act

WASHINGTON, June 6.—Evidence of definite action on the part of national trade associations to organize for activity under the National Industrial Recovery measure is reported by the Coordinating Unit of the Bureau of Foreign and Domestic Commerce, Department of Commerce. The number reported to have taken action up to May 24 was more than 50 and it has increased greatly since then. Associations representing a wide variety of industries have moved to inform their members and to extend their membership to meet the conditions of the legislation. In addition to this individual action by associations, the American Trade Association Executives, representing 150 industries, is actively at work to aid the associations represented by its members.

In announcing some of the steps taken by individual industries or associations, the bureau gives a list of 29 organizations. With several exceptions no details as to codes had been worked out, but in numerous cases committees have been selected for this purpose. The Associated General Contractors' Association, the bureau states, has already advanced specific proposals to stimulate construction and stabilize employment. These include a 130-hr. month instead of a 30-hr. week, to make allowance for weather conditions; provision for winter construction wherever practicable and measures to enable the contractor to proceed under inflation conditions. The American Road Builders' Association likewise has recommended the 130-hr. month. Blanket authority to cooperate with the Government in making provisions of the legislation effective was conferred on the board of governors of the National Electrical Manufacturers' Association at a meeting in Hot Springs, Va., May 23.

Among organizations taking "positive and definite" action are the United Typothetae of America and the National Paperboard Association. The United Typothetae reapproved the "Code of Ethics" adopted Oct. 20, 1891. The National Paperboard Association, reputed to have been the first organization to prepare a code under the Industrial Recovery bill, represents 90 per cent of the industry.

Inasmuch as it is believed the principles of this code may be followed by many other trade associations, details of its draft have been given a great deal of attention. One interesting feature is the fact that it does not provide for price fixing but maintains control over prices.

The code is outlined as follows:

1. Six-hour day.
2. "Adequate wages"—equal to 1929 wages for eight hour adjusted to cost of living index.
3. Elimination of unsound and unfair merchandising practices.
4. Approved Association code should represent 75 per cent of industry.
5. Limitation of prices.
6. Stabilization without price fixing or output restrictions, but with restrictions on price cutting and similar merchandising practices.
7. Control of excess production through graduated tax "to operate as a deterrent" and "as protection of wage levels and hours of labor."
8. Board of Trustees ("persons approved by the Government")—one appointed by industry, one by Secretary of Labor, third chosen by other two—to direct use of tax fund collected with "broad discretion."

Plan Production Session for Automotive Congress

Machine tools and gears are topics planned for the production session of the International Engineering Congress of the Society of Automotive Engineers to be held at the Palmer House, Chicago, Aug. 28-Sept. 4. The session will include an address on "Equipment Policies and Utilization of Machine Tools," by Joseph Geschelin, engineering editor, *Automotive Industries*, and a paper on "Current Practice in Finishing Gear Teeth," by F. W. Cederleaf, Buick Motor Co. "Budgeting Body Construction and Tool Costs" will be discussed by N. H. Manning, Briggs Mfg. Co., at the passenger car body session.

Gray Iron Castings Show Demand Upturn

A very encouraging upturn in the gray iron foundry industry is shown in the report of the Gray Iron Institute for April. New business increased in that month to 57.3 per cent of normal as compared with 49.8 per cent in March and with 44.6 per cent in April last year. April production was 52.7 per cent of normal as compared with 51.1 per cent in March and with 36.8 per cent in April last year. Unfilled orders were 38.6 per cent of normal as against 37.3 per cent in March and 32.5 per cent in April last year. The best production record was in the Central Western territory comprising Wisconsin and Illinois and the area west of the Mississippi River. Production in this district was 69.1 per cent of normal as compared with 62.4 per cent the previous month and with 40.3 per cent in April last year. The district comprising New England, New York and New Jersey increased to 44.3 per cent as against 38.3 per cent in March. The district comprising Ohio, Michigan, Indiana, Pennsylvania and the South declined to 45.4 per cent as against 47.9 per cent the previous month. The Chicago district operated at 61.2 per cent of normal as against 49.5 per cent the previous month.

Material and Labor In Self-Liquidating Loans

A total of 1,006,500 carloads of material will be required for the construction work authorized through self-liquidating loans by the Reconstruction Finance Corporation up to and including May 25. The total amount in loans on that date was $201,298,000, scattered over 35 states and territories, and these projects, according to engineers' estimates, will provide a total of 291,785,000 man hours of labor.

Following are the total loans and man hours of labor listed by states:

State	Total Amount Loaned or to Be Loaned	Total Direct and Indirect Man Hours
Alabama	* 77	* 296
Arizona	1,414	2,816
Arkansas	1,167	2,083
California	132,058	157,994
Colorado	1,784	2,402
Florida	650	1,004
Georgia	41	83
Idaho	60	91
Illinois	3,155	2,740
Indiana	773	1,791
Iowa	10	39
Kansas	600	1,014
Kentucky	1,023	2,811
Louisiana	16,063	30,251
Maryland	60	146
Michigan	634	887
Mississippi	325	970
Missouri	742	582
Montana	27	42
Nebraska	15	26
New Hampshire	250	3,250
New Jersey	80	195
New Mexico	5,396	27,001
New York	22,953	21,689
North Carolina	668	2,275
Ohio	493	1,188
Oklahoma	300	504
Oregon	735	1,204
Pennsylvania	100	143
Texas	2,718	6,783
Utah	709	975
Virginia	1,854	8,713
Washington	3,026	6,136
Wisconsin	40	161
Porto Rico	1,300	3,500
Total	201,300	291,785

*All figures in thousands.

Why Industry "Smells a Mouse"

SOME folks may wonder why industry, after giving such substantial support to the President's Industry Control Bill and helping in its preparation, should now be bitterly opposed to certain of its clauses.

The answer is a simple one. The Bill in its present form is *not* the Bill that was recommended to Congress by the President.

This will be apparent to any one who takes the time to read the modifications written into Section 7 of this Bill through pressure of the American Federation of Labor.

Section 7 (a) of Industry Control Bill as originally submitted by the President.

Every code of fair competition, agreement and license approved, prescribed or issued under this title shall contain the following conditions:

1—That employees shall have the right to organize and bargain collectively through representatives of their own choosing.

2—that no employee and no one seeking employment shall be required as a condition of employment to join ANY ORGANIZATION or to refrain from joining a labor organization of his own choosing and,

3—that employers shall comply with the maximum hours of labor, minimum rates of pay and other working conditions approved or prescribed by the President.

Section 7 (a) of Industry Control Bill as modified at the request of the A. F. of L.

Every code of fair competition, agreement and license approved, prescribed or issued under this title shall contain the following conditions:

1—That employees shall have the right to organize and bargain collectively through representatives of their own choosing, and shall be free from the interference, restraint, or coercion of employers of labor, or their agents, in the designation of such representatives or in self-organizations or in other concerted activities for the purpose of collective bargaining or other mutual aid or protection;

2—that no employee and no one seeking employment shall be required as a condition of employment to join any company union or to refrain from joining a labor organization of his own choosing and,

3—that employers shall comply with the maximum hours of labor, minimum rates of pay and other working conditions approved or prescribed by the President.

These alterations written into the President's proposed Bill may seem innocuous to the layman, but the intelligent industrialist is aware that they discriminate against the successful company union, officered by men who actually work at their trades and distinctly favor the soft-handed, hard-headed professional labor "leader."

As amended, this section of the bill, obviously revised at the dictation of the union labor interests, shuts the door tightly upon the employer but opens it wide for the professional organizer. There is no stipulation whatever in this revised clause against "interference, restraint or coercion" on the part of professional union executives or by labor racketeers.

General Hugh Johnson says that the A. F. of L. will not be permitted to "unionize" America and turn it into a "closed shop." But Industry would feel better if the House of Representatives had not "greased the skids" with Mr. Green's amendments.

Especially is this so in view of President Green's statement at the Harvard Club on May 25, in which, in discussing the Bill, he said:

> "It is fortunate indeed that there exists at the present time a constructive, organized labor movement, comprehending all trades and crafts. Through such an organization, Labor is prepared to organize and unite its forces so that the workers of the Nation may be protected in their rights under this legislation . . ."

What "organization" do you suppose that he had in mind as constituting the mouthpiece of American labor?

Our experience with the Motion Picture Projectors' Union and its Sam. Kaplan, the Fish Handlers' Union of New York, which has just demonstrated its power to dictate "sign or go out of business," and the typographical unions which have driven the printing industry out of New York, are all too recent and too disturbing to permit of extension to a National system.

Industry is solidly behind the President in his endeavor to establish better pay, shorter hours and good working conditions. But it is not going to tolerate, much less support, an obvious maneuver by a minority labor organization to recruit its depleted exchequers through a Congressionally assisted union membership drive.

There must be no loophole left in this Bill for self-interested minorities to creep through.

Labor Provisions in Recovery Bill Attacked at Hearing

Spokesmen for Steel Industry State Success of Act Is Imperiled by Labor Clauses—Greater Control of Imports Urged

By L. W. MOFFETT
Resident Washington Editor, The Iron Age

WASHINGTON, June 6.—Representatives of the steel and steel fabricating industries sharply attacked labor provisions of the National Industrial Recovery bill at hearings last week before the Senate Committee on Finance. Equally as vigorous were remarks made by John L. Lewis, president of the United Mine Workers, in his support of the provisions.

The steel interests expressed serious doubt as to the success of the measure unless the labor provisions were modified so as to remove what they declared to be unreasonable and impossible prohibitions upon the employer. Through Charles R. Hook, president of the American Rolling Mill Co., request was made that the committee accept an amendment as a substitute for the labor provision carried in the House bill so that the right of collective bargaining may be recognized through mutual agreement between both employers and employees. As drawn, it is charged, the bill recognizes the right for labor only. Mr. Hook also suggested that the provisions regarding company unions be amended. The House measure provided that no employee and no one seeking employment shall be required as a condition of employment to join any company union or to refrain from joining a labor organization of his own choosing. Mr. Hook's amendment would strike out reference to the company union. It aims to prevent interference by outside labor representatives with dealings between employers and employees within an industry.

Views of a similar character were presented by R. P. Lamont, president of the American Iron and Steel Institute, speaking for the iron and steel industry as a whole, and by C. E. Michael, president of the Virginia Bridge & Iron Co., representing the Virginia Manufacturers' Association. Mr. Hook appeared as a member of the steering committee of the National Association of Manufacturers, which cooperated with Government officials in drafting provisions of the bill.

The principles of the measure, looking to the rehabilitation of industry and business, increase in employment and rates, together with stabilization of production and prices and elimination of destructive competition, were strongly supported by the steel representatives. Thomas J. Doherty, counsel for the institute, asked that the "Buy American" amendment be broadened.

The differences over the labor provisions, however, were sharp and again brought to the surface the conflict between advocates of the open and closed shop.

The steel representatives also insisted that the bill should provide for control over foreign competition and attacked the licensing and tax features. Elimination of the licensing feature was urged and a general sales tax was sponsored.

Colonel Lamont Opposes Closed Shop

Mr. Lamont told the committee that the iron and steel industry desired to state its position clearly with reference to the labor clauses. Earnestly espousing the open shop, Mr. Lamont said the industry was going on record because of the lack of clarity and definition in the labor clauses and doubt as to the meaning and intent of some of the changes made in the bill since it was introduced in the House. Also, he pointed out, it was the purpose of the industry to set forth its position because silence now might later be misinterpreted.

Explaining that his statement was made without antagonistic feeling or prejudice, Colonel Lamont said:

"The industry stands positively for the open shop; it is unalterably opposed to the closed shop. For many years it has been and is now prepared to deal directly with its employees collectively on all matters relating to their employment. It is opposed to conducting negotiations regarding such matters otherwise than with its own employees; it is unwilling to conduct them with outside organizations of labor or with individuals not its employees. The industry accordingly most strongly objects to the inclusion in the pending bill of any provisions which will be in conflict with this position of the industry, or of any language which implies that such is the intent of the legislation. If this position is not protected in the bill, the industry is positive in the belief that the intent and purpose of the bill cannot be accomplished."

Lewis Upholds Labor Provisions

Organized labor, however, stood firm for the provisions and expressed confidence that the measure would be enacted without any modification digressing from demands they made. The labor provisions largely are the product of William Green, president of the American Federation of Labor, and Donald R. Richberg, counsel for railroad unions. Mr. Richberg has been selected by Gen. Hugh Johnson, named by President Roosevelt to be administrator of the act, as the former's assistant. General Johnson has moved his quarters to the Department of Commerce from the State Department and is actively engaged in work preliminary to the vast program which will lie ahead, including passing upon and effectuating the great volume of trade practice codes which will undoubtedly deluge his organization from all businesses and industries of the country.

Mr. Lewis, the last witness before the Senate committee which closed hearings last Friday, protested strongly against any "emasculation" of the labor provisions. He particularly insisted upon the provision preventing employers making as a condition of employment that workers join a company union and the provision permitting workers to join any union of their own choosing.

He assailed the position of Colonel Lamont and revived old charges of organized labor that "secret service operatives of steel companies report the man who attends union meetings or who signifies intention to join a union." Such a man, he said, "is immediately discharged." Answering a question by Senator Reed of Pennsylvania, a leading opponent to the bill, Mr. Lewis said that the so-called espionage is not followed by the United States Steel Corpn. in Indiana and Illinois, "where they deal with the union."

C. R. Hook Urges Control of Imports

Prefatory to proposing his substitution for the House bill labor clauses, Mr. Hook said:

"The happy relationship which has existed between employer and employee in this country during the past 10 years, and particularly during this period of great personal and corporate suffering, should not be endangered by any wording in the bill which would permit of misinterpretation or imply a privilege on the part of employees or on the part of those not employees of a corporation which it is intended they should not have. I am quite sure it is the desire of Congress as well as the President

to recognize the right of employees to bargain individually or collectively and to belong to or not to belong to labor organizations as they choose, and that where collective relations exist or are established, they should be in any form which is mutually agreeable to the parties, and in which their respective representatives are designated without interference by either party or by those not connected by employment with the industrial corporation in whose plants the questions of hours of labor, rates of pay and other working conditions are under consideration."

In urging control of foreign competition, Mr. Hook pointed out that the prime objective of the measure is to increase employment and thereby cause a normal exchange of goods and services among the citizens of the country. He expressed the opinion that these results will not be accomplished unless the President is given authority to make such regulations as are necessary to protect American-made goods and American workmen against the influx of foreign-made goods produced under labor conditions and with wage rates and other conditions not comparable with American standards.

Regarding taxation, Mr. Hook said it is his personal opinion that the most equitable method of taxation is to spread a one point manufacturers' sales tax over industries.

C. E. Michael Questions Constitutionality of Licensing Provision

Mr. Michael urged a provision giving the President authority to embargo or control the importation and distribution of products at lower price levels than those which will of necessity obtain for domestic production, manufacture and distribution. He likewise said it is essential that the proposed law provide more definitely for the creation of an agency of representative, executive, administrative and advisory talent representing business or industry and labor to assume final responsibility for its administration.

Opposing the license provision giving the President authority to refuse licenses to those not complying with fair practice codes, Mr. Michael fully supported the plan to wipe out sweatshops and unfair practices, but said the President is given sufficient powers in another section to meet the purposes of the provision. He also said the constitutional validity of the license provision is questioned.

In the course of his attack on labor provisions in the bill, Mr. Michael charged that labor officials are contemplating that all employees in industry must be organized into labor unions, "whose representatives propose to negotiate and conclude with representatives of given trade industries, agreements as to hours, wages and working conditions for that industry, which plan in our judgment is impossible of successful consummation." He declared that "if such a plan were physically possible or successful, we would certainly observe more than 7 to 10 per cent of employees in gainful occupations belonging to labor organizations today."

Mr. Michael said that it is common knowledge that in the Federal and State labor departments the words "collective bargaining" have been universally interpreted to mean collective bargaining by and through organizers or representatives of labor unions, "whereas we know collective bargaining is practiced every day between employees and employers in thousands of individual establishments."

The interpretation given by labor, it was pointed out, is contrary to the provisions of the bill where employment conditions may be established by mutual agreements between employers and employees. It was added, however, that the balance of the clause virtually says that the employer shall not be permitted to take any action to protect or defend his organization and business from any ill-advised attempts to break down existing agreements and morale which have proved most successful in operation to the large majority of American employees and employers alike.

Adkerson Amendment Attacked

Mr. Doherty approved a request made by a witness for the textile industry that the bill substitute the "Buy American" amendment now incorporated in the Post Office-Treasury Appropriation act instead of a much more rigid provision which was incorporated by the House committee at the suggestion of J. Carl Adkerson, president of the American Manganese Producers' Association. Mr. Doherty and other steel representatives distinctly dissent from the view that the two amendments have the same purpose. The existing law permits the use of foreign materials when not reasonably available, and does not apply to all ingredients and constituents in the manufacture of steel and other products. It requires that articles furnished the Government be manufactured in the United States substantially from domestic materials. It was held that the Adkerson amendment is so rigid as to be impracticable. Mr. Adkerson contended that American manganese of high grade can be supplied to the steel industry at prices less than foreign manganese of lower grade, a statement that repeatedly has been challenged by the steel industry generally.

The striking out of the licensing feature and insertion of the foreign competition provision were two of the principal points urged by President R. P. Lamont of the American Iron and Steel Institute; Charles R. Hook, president of the American Rolling Mill Co.; President Robert L. Lund of the National Association of Manufacturers and C. E. Michael, president of the Virginia Bridge & Iron Co. But the majority of the committee apparently considered to be untouchable the labor provisions, which industrialists have fought so strenuously. The committee also knocked out the "Buy American" amendment. The iron and steel industry generally opposed this amendment as incorporated in the bill by the House Committee on Ways and Means. But the industry made an earnest plea that the "Buy American" amendment as carried in the Post-office-Treasury appropriation act be incorporated in the Industry Recovery measure, for it is more liberal than the provision in the House bill requiring that appropriations provided in the measure be expended for materials of American origin.

Licensing Provision Restored

At the insistence of President Roosevelt, however, the licensing provision was restored yesterday to the bill by a vote of 12 to 6 in the committee. The bill having been finished as to other sections was introduced today. General Johnson, who will be administrator of the act, has declared that the success or failure of the measure probably will be determined within six weeks. And success or failure, he added, depends upon whether the great industries of the country will offer their help and go along with the administration. He frankly told coal operators that he thinks the country is now in one of its most critical periods of the depression and emphasized the need of industries working with the government toward recovery. With free cooperation he indicated certainty that recovery would be brought about within a reasonable time. He said as administrator he proposes to assist both industry and labor, to be fair to both, not to permit labor to use provisions of the bill to unionize industry, but to firmly enforce the law. In insisting upon the licensing provision he said it was needed only to whip small recalcitrant minorities into line. He expressed confidence the provision would rarely have to be used. But if it has to be used, he told the coal operators, it will be, and speaking of any group in industry, he said if it balks it will be fined if it doesn't fall into line and will be jailed, if that be necessary.

General Johnson's talk was strikingly straightforward. Nevertheless, he left a favorable impression on the coal operators because of his sincerity and announced determination to be fair to all interests. He strongly asserted that there is no intention of being a "czar of industry."

The coal operators, representing all sections of the country, yesterday named a central coordinating committee of 19 to prepare a master code which will be passed upon by the vari-

ous districts to meet their peculiar conditions. The codes then will be submitted to General Johnson's office.

Provision Strenuously Opposed

There were lively fights in the committee over all sections of the bill including the industry recovery, public works and taxation. That some Democrats have turned against the industry recovery section was shown by a motion offered by Senator Clark of Missouri to strike out this entire section. The motion was voted down, 10 to 8, a remarkably close vote. It was held to be significant in that it apparently reflects that even many Democrats are turning from the measure. Yet it apparently has sufficient support and the administration is doing all in its power to cash in on this support quickly before it fades further. It is hoped to get the bill through the Senate by the end of the present week or early next week, have it go to conference, differences ironed out, and the measure signed by the President by the end of next week, if not sooner.

Chairman Vinson of the House Committee on Naval Affairs has announced that the navy is prepared to begin building 30 new ships under the public works section. The program calls for the appropriation of $230,000,000 for naval vessels of which $46,000,000 would be made available for the first year, the remainder to be allocated by the President. Representative Vinson said the ships for which contracts can be awarded within 60 to 90 days are: Twenty destroyers, four submarines, two 13,000-ton aircraft carriers and four 6-in., 10,000-ton cruisers.

Manufacturers in Protest Meeting

Attended by about 600 members, the National Association of Manufacturers at a meeting in Washington last Saturday adopted resolutions taking a position on the Industrial Recovery bill like that reflected by Mr. Lamont, Mr. Hook and Mr. Michael. It also adopted a resolution urging that the President be given authority to spend the $3,300,000,000 appropriated in the public works section of the measure so as not to "discourage or hold back the revival of private employment."

The National Association of Credit Men, which will hold its annual convention at the Hotel Schroeder, Milwaukee, June 19 to 23, is to have trade group meetings on June 20, in connection with its Credit Congress of Industry. T. J. Sullivan, of the Inland Steel Co., Chicago, is chairman of the iron and steel group.

N.I.A.A. Completes Plans For Marketing Conference

Industrial advertising and sales executives will find much of interest in the program announced for the eleventh annual convention of the National Industrial Advertisers' Association at the Medinah Athletic Club, Chicago, June 26 to 27.

The program, now completed, includes the following papers:

"Industrial Advertising and Its Opportunities in Today's and Tomorrow's Markets," by W. L. Rickard, president, Rickard & Co.

"How We Operate Our Advertising Department in Connection With Our Personal Selling To Industry," by General Thomas S. Hammond, president Whiting Corpn., president Illinois Manufacturers Ass'n.

"How To Plan and Develop Market Research that Will Pay Dividends," by A. C. Nielsen, president A. C. Nielsen Co.

"Advertising and Marketing Lessons We Have Learned From the Depression," by Bennett Chapple, vice-president, American Rolling Mill Co.

"Who Is the Industrial Advertising Manager and Who Is the Industrial Sales Manager?" by L. R. Garretson, advertising manager, Leeds & Northrup Co.

"Industrial Art as An Ally of Advertising," by W. H. Dohner, art director, engineering department, Westinghouse Electric & Mfg. Co.

"Sales Promotion Program of Crane Co.," by R. G. Creviston, sales promotion manager, Crane Co.

"Collective Catalogs," by William Buxman, vice-president, McGraw-Hill Directory Publishing Co.

"House Organs that Have Made Sales During the Depression," by R. K. Clark, Shell Petroleum Co.

Other speakers who will participate in the discussions and clinical sessions are Dale Wylie, Iron Fireman Co.; Frank Wyse, Bucyrus-Erie Co.; J. D. Ferch, Harnischfeger Corpn.; B. R. Graff, Creamery Package Co.; R. Davison, New Jersey Zinc Co.

The exhibits, which make up an important feature of the convention, will show diversified specimen material which is being successfully used in sales promotion work in many fields.

Sheet and Tin Plate Wage Scales Reaffirmed

The Amalgamated Association of Iron, Steel and Tin Workers and the Western Sheet & Tin Plate Manufacturers Association at a meeting of committees held in Cleveland last week agreed on the reaffirmation of last year's sheet and tin plate wage scale with a few modifications. The only important changes made in the new wage agreement are slight reductions in the wage rates paid the higher priced workmen. The rate for sheet mill rollers is reduced 10 per cent, for sheet mill heaters 7½ per cent and shearmen 5 per cent from last year's wage rates. The new agreement becomes effective July 1 and will continue for a year.

Pressed Metal Institute Will Hold Conference

All stamping plants interested in making stampings to customers' specifications are invited to be present at a meeting of the Pressed Metal Institute which is called for June 24, at 9 a. m., in the Statler Hotel Buffalo.

At this meeting the proposed National Industrial Recovery Act will be discussed by Fred M. Rayburn of the Department of Commerce. Mr. Rayburn will cover just what each industrial group and each individual plant is expected to do.

Those planning to attend should advise Malcolm Baird, secretary-treasurer, 232 Delaware Avenue, Buffalo.

Steel Coordinator Not Yet Named

WASHINGTON, June 6.—Report that a coordinator has been named to represent the steel industry in connection with the Industry Control plan is premature. In response to inquiry on this point, General Hugh Johnson states that he has not as yet named a coordinator and cannot until the bill is passed and he becomes the official administrator. It is believed in Washington, however, that J. Leonard Replogle has been tentatively offered the post.

Mr. Replogle was identified for many years with the steel industry, having been vice-president and general sales manager of Cambria Steel Co.; president, Vanadium Corpn., and chairman of Replogle Steel Co. During the World War, he was director of steel supply for the War Industries Board.

Spelter Freight Rate Decision Postponed

WASHINGTON, June 6.—The Interstate Commerce Commission has suspended until Jan. 1, 1934, the operation of railroad tariffs proposing to reduce rates on spelter in carloads from points in Arkansas and Oklahoma to points in Illinois, Indiana and Wisconsin. Illustrative of proposed rates, in cents per 100-lb., are those of 24c. and 20.5c. which would be established on shipments from Fort Smith, Ark., and Quinton, Okla., to Chicago and Peoria, Ill., respectively. Existing rates are 25.5c. and 22c.

May Steel Ingot Output Two Million Tons

A LITTLE over 2,000,000 tons of open-hearth and Bessemer ingots were produced in May, 1933, according to the latest monthly report of the American Iron and Steel Institute. This is the largest tonnage for any month since June, 1931.

The average operating rate for the month, as calculated by the Institute on the basis of total capacity at the end of 1931 was 34.11 per cent. This coincides almost exactly with the average of the weekly estimates published in THE IRON AGE during the month of May.

While the increase over April was close to 50 per cent, in tonnage produced, the operating rate, quite satisfactory to the industry under the circumstances, will fall short of the expectations of those who had been led, by over-enthusiastic reports, to look for an average production rate of well over 40 per cent of capacity.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Gross Tons)

Reported for 1933 by Companies Which Made 93.71 Per Cent of 1932 Ingot Output

1932	Open-Hearth	Bessemer	Calculated Output All Companies: Monthly	Calculated Output All Companies: Daily	No. of Working Days	Per Cent Operation
January	1,230,907	160,633	1,484,991	57,115	26	26.41
February	1,230,970	157,067	1,481,253	59,250	25	27.40
March	1,149,193	193,944	1,433,337	53,087	27	24.55
April	1,036,163	144,197	1,259,629	48,447	26	22.40
May	950,838	103,593	1,125,243	43,279	26	20.01
June	755,068	100,249	912,757	35,106	26	16.23
July	653,039	102,916	806,722	32,269	25	14.92
August	696,122	97,323	846,730	31,360	27	14.50
September	804,470	124,970	991,858	38,148	26	17.64
October	885,773	132,876	1,087,058	41,810	26	19.33
November	838,419	128,844	1,032,221	39,701	26	18.36
December	724,917	81,932	861,034	33,117	26	15.31
Total	10,955,879	1,528,544	13,322,833	42,701	312	19.75

The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1931, of 67,473,630 gross tons for Bessemer and open-hearth steel ingots. Figures given for "Calculated Output," monthly and daily are revised.

PRODUCTION OF OPEN-HEARTH AND BESSEMER STEEL INGOTS
(Gross Tons)

Reported for 1933 by Companies Which Made 96.57 Per Cent of 1932 Ingot Output

1933	Open-Hearth	Bessemer	Calculated Output All Companies: Monthly	Calculated Output All Companies: Daily	No. of Working Days	Per Cent Operation
January	885,743	109,000	1,030,075	39,618	26	18.23
February	922,806	126,781	1,086,867	45,286	24	20.83
March	784,168	94,509	909,886	33,699	27	15.50
April	1,180,893	135,217	1,362,856	54,514	25	25.08
May	1,716,482	216,841	2,001,991	74,148	27	34.11
Five Months	5,490,092	682,348	6,391,675	49,548	129	22.79

The figures of "per cent of operation" are based on the annual capacity as of Dec. 31, 1932, of 67,386,130 gross tons for Bessemer and open-hearth steel ingots.

All monthly production figures except for May, 1933, are revised. All "Calculated Output," and operating percentages except for May, 1933, are adjusted and revised.

Fabricated Structural Steel

Awards in Fair Volume—New Projects Decline

LETTINGS of 11,800 tons are equal to those of a week ago, which also totaled 11,800 tons. The largest booking is for the City Health Center in New York, which will require 3225 tons; a toll bridge at Kansas City for the Regional Bridge Co. accounts for 2000 tons. New projects call for only 5950 tons, including 2000 tons for a plant at Corpus Christi, Tex., for the Southern Alkali Co., on which bids were opened June 2. Fabricated steel contracts in May totaled 150,085 tons, compared with 43,850 tons in April and 50,300 tons in March. Awards for the week follow:

NORTH ATLANTIC STATES

New York, 3225 tons, City Health Center, to McClintic-Marshall Corpn.

Brooklyn, 170 tons, dairy alteration, 3480 Fulton Street, to Dreier Iron Works.

Erie Railroad, 1850 tons, bridge No. 272 at Elmira, N. Y., to McClintic-Marshall Corpn.

Treichlers, Pa., 340 tons, State highway bridge, to McClintic-Marshall Corpn.

Topton, Pa., 100 tons, factory building for Klein Stove Co., to McClintic-Marshall Corpn.

THE SOUTH

Baton Rouge, La., 460 tons, drums and towers for Standard Oil Co. of New Jersey, to Hedges-Walsh-Weidner Co., Chattanooga.

CENTRAL STATES

Chicago, 490 tons, Twelfth Street viaduct, to American Bridge Co.

Indiana Harbor, Ind., 1500 tons, tin mill for Inland Steel Co., to an unnamed bidder.

Kansas City, Mo., 2000 tons, toll bridge for Reginal Bridge Co., to Kansas City Structural Steel Co.

Adair County, Mo., 600 tons, bridges, to Stupp Brothers Bridge & Iron Co.

Whitham, Mo., 105 tons, 18 I-beam spans for Wabash Railway Co., to American Bridge Co.

Fountain Grove, Mo., 105 tons, 21 I-beam spans for Wabash Railway Co., to American Bridge Co.

PACIFIC COAST

Stanislaus and San Joaquin Counties, Cal., 414 tons, State highway bridge, to McClintic-Marshall Corpn.

Seattle, 160 tons, derricks, to Pacific Hoist & Derrick Co.

Sand, Ore., 240 tons, three spans for Union Pacific System, to American Bridge Co.

NEW STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

Boston, 150 tons, Hyde Park school.

Catskill, N. Y., 12,000 tons, Rip Van Winkle bridge; Frederick Snare Corpn., New York, low bidder on general contract.

Corning, N. Y., 330 tons, New York Central Railroad viaduct; bids June 13.

Wilkes-Barre, Pa., 400 tons, Y.M.C.A. building; bids June 12.

Jersey Shore, Pa., 600 tons, State highway bridge; bids June 16.

State of Pennsylvania, 335 tons, highway bridge, route 175, Lehigh and Northampton counties; McClintic-Marshall Corpn., low bidder.

THE SOUTH

Caldwell, Ky., 149 tons, highway bridge.

Corpus Christi, Tex., 2000 tons, manufacturing plant for Southern Alkali Co., bids opened at Barberton, Ohio, June 2.

CENTRAL STATES

Prairie du Sac, Wis., 500 tons steel sheet piling for extension of Wisconsin Power & Light Co. dam; bids June 8.

Chesapeake & Ohio Railroad, 600 tons, rebuilding bridge No. 11 at Cincinnati.

Hinsdale, Ill., 215 tons, State highway bridge over Chicago, Burlington & Quincy Railroad; Thorp-Rogoff Co. low bidder on general contract.

Missouri Pacific Railroad, 1500 tons, beam spans for various locations.

FABRICATED PLATE

AWARDS

Milton, Pa., 160 tons, standpipe, to Pittsburgh-Des Moines Steel Co.

Pittsburgh, 900 tons, eight barges for Campbell Transportation Co., to Jones & Laughlin Steel Corpn.

Conneaut, Ohio, 210 tons, elevated tank, to Chicago Bridge & Iron Works.

Louisville, Ky., 240 tons, brewery tanks for Falls City Ice & Beverage Co., to Biggs Boiler Works.

Milwaukee, 1300 tons, 163 tanks for Schlitz Brewing Co., to Heil Co., Milwaukee.

NEW PROJECTS

Catskill, N. Y., 1000 tons, pipe line, Rip Van Winkle bridge project.

Orrville, Ohio, 110 tons, elevated tank.

New Orleans, 625 tons, three barges for Anderson-Clayton & Co., New Orleans.

Oakland, Cal., 100 tons, two tanks; bids June 9.

Seattle, 375 tons of 20-in. pipe for Alki Water Improvement; alternatives on cast iron and wood, bids June 8.

Lynwood, Cal., 100 tons, elevated tank; Chicago Bridge & Iron Works, low bidder.

Los Angeles, 4300 tons, conduit pipe for Bouquet Canyon Dam; Southwest Welding & Mfg. Co., low bidder.

Pig Iron Daily Output Gained 37.7 Per Cent in May

MAY production of coke pig iron totaled 887,252 gross tons against 623,618 tons in April. The May daily rate, at 28,621 tons, showed a gain of 37.7 per cent over April rate of 20,787 tons daily. The daily rate in May was the highest since March, 1932, which was 31,201 tons.

There were 63 furnaces in operation on June 1, making iron at the rate of 33,160 tons daily, compared with 48 on May 1, with a daily operating rate of 22,805 tons. Seventeen furnaces were blown in and two taken off blast, making a net gain of 15 furnaces. The Steel Corporation blew in six. The independents blew in nine furnaces and took two off blast, and merchant producers put two furnaces in.

Among the furnaces blown in are the following: one Edgar Thomson, one Ohio, one Farrell, of the Carnegie Steel Co.; one Lorain, of the National Tube Co.; one Gary and one South Chicago, of the Illinois Steel Co.; one Aliquippa, one Eliza, one Hubbard and one Indiana Harbor unit of the Youngstown Sheet & Tube Co.; a Haselton and a Pioneer unit of the Republic Iron & Steel Co.; one unit of the Shenango Furnace Co.; one of the Weirton furnaces of the Weirton Steel Co.; a City furnace of the Sloss-Sheffield Steel & Iron Co.; a River furnace of the Corrigan, McKinney Steel Co., and the Ashland furnace of the American Rolling Mill Co. The Pittsburgh Steel Co. blew out one of its Monessen furnaces and the Colorado Fuel & Iron Co. banked a Colorado furnace.

Production of Coke Pig Iron and Ferromanganese

Gross Tons

	Pig Iron*		Ferromanganese†	
	1933	1932	1933	1932
January	568,785	972,784	8,810	11,250
February	554,330	964,280	8,591	4,010
March	542,011	967,235	4,783	4,900
April	623,618	852,897	5,857	481
May	887,252	783,554	5,948	5,219
June	.....	628,064	....	7,702
½ year	.....	5,168,814	....	33,562
July	.....	572,296	....	2,299
August	.....	530,576	....	3,414
September	.....	592,589	....	2,212
October	.....	644,808	....	2,302
November	.....	631,280	....	5,746
December	.....	546,080	....	7,807
Year	.....	8,686,443	....	57,342

*These totals do not include charcoal pig iron. The 1932 production of this iron was 15,055 gross tons.
†Included in pig iron figures.

Production by Districts and Coke Furnaces in Blast

Furnaces	Production (Gross Tons) May (31 Days)	Production (Gross Tons) April (30 Days)	June 1 Number in Blast	June 1 Operating Rate, Tons a Day	May 1 Number in Blast	May 1 Operating Rate, Tons a Day
New York:						
Buffalo	29,672	15,553	2	955	2	710
Other New York and Mass.	....	....	0	....	0	....
Pennsylvania:						
Lehigh Valley	23,480	17,695	2	690	2	590
Schuylkill Valley	12,143	12,743	1	390	1	425
Susquehanna and Lebanon Valleys	....	....	0	....	0	....
Ferromanganese	2,745	2,923	1	90	1	95
Pittsburgh District	126,721	95,956	10	4,640	8	3,385
Ferro. and Spiegel	3,203	2,184	1	105	1	70
Shenango Valley	31,844	16,348	3	1,515	1	545
Western Pa.	19,793	12,910	1	640	1	430
Ferro and Spiegel.	....	....	0	....	0	....
Maryland	43,298	39,592	2	1,395	2	1,320
Wheeling District	106,182	80,411	5	3,665	4	2,750
Ohio:						
Mahoning Valley	105,782	60,722	8	4,765	5	2,715
Central and Northern	113,211	83,034	7	4,300	5	2,685
Southern	26,165	24,478	2	845	1	815
Illinois and Indiana	167,345	95,820	10	6,415	7	4,140
Mich., Wis. and Minn.	14,492	13,635	1	465	1	455
Colo., Mo. and Utah	10,946	17,888	1	135	2	595
The South:						
Virginia	....	....	0	....	0	....
Kentucky	....	....	1	300	0	....
Alabama	48,583	30,976	4	1,800	2	1,030
Ferromanganese	....	....	0	....	0	....
Tennessee	1,647	750	1	50	1	50
Total	887,252	623,618	63	33,160	48	22,805

Daily Average Production of Coke Pig Iron

Gross Tons

	1933	1932	1931
January	18,348	31,380	55,299
February	19,798	33,251	60,950
March	17,484	31,201	65,556
April	20,787	28,430	67,317
May	28,621	25,276	64,325
June	.....	20,935	54,621
½ year	.....	28,412	61,356
July	.....	18,461	47,201
August	.....	17,115	41,308
September	.....	19,753	38,964
October	.....	20,800	37,848
November	.....	21,042	36,782
December	.....	17,615	31,625
Year	.....	23,733	50,069

Merchant Iron Made, Daily Rate

1933	*Tons*	1932	*Tons*
January	2,602	January	6,256
February	2,863	February	7,251
March	2,412	March	7,157
April	1,908	April	5,287
May	3,129	May	4,658
June	....	June	6,090
July	....	July	3,329
August	....	August	3,070
September	....	September	3,213
October	....	October	4,286
November	....	November	4,435
December	....	December	3,674

Pipe Lines

Western Gas Co., Bassett Tower Building, El Paso, Tex., plans natural gas steel pipe line from Douglas to Tucson, Ariz., connecting at first noted place with company system from oil fields in eastern New Mexico. Line will be extended later to Phoenix, Ariz., and vicinity. It will approximate 300 miles, requiring about 16,000 tons welded steel pipe. Connection will be made at Tucson with system of Tucson Gas, Electric Light & Power Co., which will carry out local distribution. Negotiations are under way for financing in amount of $2,200,000 for work.

United States Engineer Office, Detroit, asks bids until June 13 for four lengths spiral riveted galvanized steel pressure pipe (Circular 64).

Pomona, Cal., plans early purchase of about 5700 ft. 12-in. welded steel pipe for water service. F. C. Froehde is city engineer.

Stevens Brothers & Miller-Hutchinson Co., New Orleans and St. Paul, Minn., engineering contractor, has organized a subsidiary to operate natural gas properties and pipe lines in Mississippi. New company has begun operations in gas fields in Hinds and Rancin counties, Miss., and has brought in wells to date totaling about 50,000,000 cu. ft. open flow capacity. Plans are being considered for steel pipe lines for main trunk and distributing service.

Metropolitan Water District, Los Angeles, has taken bids on 100 tons of 22-in. No. 14 gage black sheet steel pipe.

Cast Iron Pipe

Board of City Commissioners, Wildwood, N. J., is considering pipe line from Rio Grande pumping plant to city, for main water supply. Cost over $175,000. Financing is being arranged.

Rome, Ga., plans installation of main lines for water service. Cost about $20,000.

Houma, La., plans water pipe line to Daigleville and vicinity; Edward Wright, mayor, is in charge.

Wilmette, Ill., has purchased 300 tons from James B. Clow & Sons.

Andrew Kraus, Willapa, Wash., and associates have secured permit to use water from Stringer Creek, tributary of Willapa River, for water supply at Menlo, Wash., and vicinity. About nine miles of pipe will be installed for trunk line. Entire project will cost about $80,000.

Seattle will take bids June 8 on 1350 tons of 20-in. for Alki Water Improvement, with alternatives for steel and wood.

Snohomish, Wash., is buying 123 tons of 10-in. in open market.

South Pasadena, Cal., has taken bids on 150 tons of 10-in. class 250.

Los Angeles has awarded 646 tons of 16 and 20-in. to American Cast Iron Pipe Co.

Oakland, Cal., has awarded 1548 tons of 4 to 8-in. to United States Pipe & Foundry Co.

Railroad Equipment

Chicago Great Western has ordered 500 steel box cars from Pullman Car & Mfg. Corpn.

Steel Producers Reluctant to Sell in View of Uncertainty as to Costs

Quarterly Contracting Likely to Be Superseded by Month-to-Month Basis Pending Stabilization—Production Rate Rises to 44 Per Cent—Scrap Again Advances

PENDING industrial control legislation at Washington overshadows all other considerations in the iron and steel market. Uncertainty as to the exact form in which the act will be passed and the manner in which its provisions will be enforced has made future operating cost an unknown quantity.

Whether the working week will be 40 hr., 32 hr. or some other specified period, whether base wage rates will be increased and how much, and many other undetermined factors have added to the spirit of confusion that exists in the industry. Sensing that higher prices are a certainty, many consumers, among them some of the largest in the country, have attempted to cover their steel requirements through the third quarter. But they have encountered a general reluctance to sell; in fact, certain mills have fixed July 1 as the deadline for orders at present prices and there is a strong possibility that sales for quarterly periods will be definitely abandoned in favor of month-to-month commitments.

WHILE the status of most finished steel prices remains unsettled, pending developments at the nation's capital, advances have been announced on other products, among them nuts and bolts, wire mesh, rail steel bars, ferromanganese and refractories. Rail steel bars have been marked up $4 a ton to 1.50c. a lb., mill, while refractories prices are $5 a ton higher. The new price on ferromanganese, which represents an increase of $4 a ton, is for spot delivery only, indicating that a further advance may be made on July 1.

In some instances, as in the case of bolts and nuts, refractories and coal, advances in wages have accompanied higher asking prices for the resultant products.

Concern over the labor provisions in the industrial recovery act is reflected in the current action of certain producers in encouraging the formation of works councils among their employees. Among many iron and steel companies organizations of this type have been functioning for a considerable number of years.

CURRENT indices of production and demand are still pointing upward. Ingot output has risen from 41 per cent to 44 per cent of capacity, continuing the advance which was so pronounced throughout May. At Pittsburgh the operating rate rose from 28 to 32 per cent, at Chicago from 40 to 42 per cent, in the Valleys from 45 to 50 per cent, in the Cleveland-Lorain area from 54 to 65 per cent and in the Wheeling district from 80 to 85 per cent. Evidences of contraction in finished steel demand are entirely lacking and in some quarters the view is now held that June bookings will exceed those of last month. It is to be conceded, of course, that buyers have every incentive to make protective purchases, but the chances for speculative covering are minimized because of the reluctance of mills to commit themselves. Such advance sales as have been made are usually tonnages for specific projects on which the mills are assured full specifications within a given time.

The gain in steel ingot production in May, as reported by the American Iron and Steel Institute, was 36 per cent, which compares with an increase of 37.7 per cent in pig iron production. Pig iron output in May, as computed from returns to THE IRON AGE, was 887,252 gross tons, against 623,618 tons in April. The May daily rate, at 28,621 tons, was 64 per cent higher than that of March and 67 per cent over that of August, 1932, the depression low. Sixty-three furnaces were in blast June 1, compared with 48 on May 1, a net gain of 15 stacks.

REVISION of sales forecasts in the steel industry is matched by altered expectations among automobile manufacturers. Despite the fact that May assemblies were the largest for any month since July, 1931, in some cases retail sales outdistanced output. Hence a seasonal drop in production this month is no longer regarded as a certainty. Even the most conservative estimates place this month's assemblies at 190,000 units. The buoyant attitude of the automobile trade is evidenced in the announcement of 5 per cent wage increases by the General Motors and Cord organizations.

Fabricated structural steel awards, at 11,800 tons, equaled those of a week ago. No material increase in heavy construction work is looked for until the Government's public works program is launched. Similarly railroad buying of any consequence is delayed pending final enactment of the rehabilitation bill and the appointment of a railroad coordinator. Of 7000 tons of rails placed by the New York Central, 2000 tons went to the Bethlehem Steel Corpn. and 5000 tons to the United States Steel Corpn. The Steel Corporation's share will be rolled at Gary. The Norfolk & Western has bought 6000 kegs of spikes and 3500 tons of tie plates but has not yet taken action on its inquiry for 10,000 tons of rails. The Seaboard Air Line is in the market for 11,000 tons of rails.

Scrap, which is always a sensitive barometer, again shows signs of increasing strength, with advances reported at Pittsburgh, Chicago and Detroit.

▲▲▲ A Comparison of Prices ▲▲▲

Market Prices at Date, and One Week, One Month and One Year Previous
Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron	June 6, 1933	May 29, 1933	May 9, 1933	June 7, 1932
Per Gross Ton:				
No. 2 fdy., Philadelphia	$16.34	$16.34	$15.34	$14.84
No. 2, Valley furnace	15.50	15.50	14.50	14.50
No. 2 Southern, Cin'ti	16.51	16.51	15.82	13.82
No. 2, Birmingham	12.00	12.00	12.00	11.00
No. 2 foundry, Chicago*	16.00	16.00	15.50	16.00
Basic, del'd eastern Pa.	16.09	16.09	15.09	16.00
Basic, Valley furnace	15.00	15.00	14.00	14.00
Valley Bessemer, del'd P'gh.	17.89	17.89	16.89	16.89
Malleable, Chicago*	16.00	16.00	15.50	16.00
Malleable, Valley	15.50	15.50	14.50	15.00
L. S. charcoal, Chicago	23.17	23.17	23.17	23.17
Ferromanganese, seab'd	68.00	68.00	68.00	68.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

Rails, Billets, etc.				
Per Gross Ton:				
Rails, heavy, at mill	$40.00	$40.00	$40.00	$43.00
Light rails at mill	30.00	30.00	30.00	32.00
Rerolling billets, Pittsburgh	26.00	26.00	26.00	27.00
Sheet bars, Pittsburgh	26.00	26.00	26.00	26.00
Slabs, Pittsburgh	26.00	26.00	26.00	27.00
Forging billets, Pittsburgh	31.00	31.00	31.00	33.00
Wire rods, Pittsburgh	35.00	35.00	35.00	37.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.60	1.60	1.60	1.60

Finished Steel				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.60	1.60	1.60	1.60
Bars, Chicago	1.70	1.70	1.70	1.70
Bars, Cleveland	1.65	1.65	1.65	1.65
Bars, New York	1.95	1.95	1.95	1.95
Tank plates, Pittsburgh	1.50	1.50	1.50	1.60
Tank plates, Chicago	1.70	1.70	1.70	1.70
Tank plates, New York	1.598	1.598	1.598	1.898
Structural shapes, Pittsburgh	1.60	1.60	1.60	1.60
Structural shapes, Chicago	1.70	1.70	1.70	1.70
Structural shapes, New York	1.86775	1.86775	1.86775	1.86775
Cold-finished bars, Pittsburgh	1.70	1.70	1.70	1.70
Hot-rolled strips, Pittsburgh	1.55	1.55	1.45	1.40
Cold-rolled strips, Pittsburgh	2.00	2.00	1.80	2.00

Finished Steel	June 6, 1933	May 29, 1933	May 9, 1933	June 7, 1932
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Hot-rolled annealed sheets, No. 24, Pittsburgh	2.10	2.10	2.00	2.20
Hot-rolled annealed sheets, No. 24, Chicago dist. mill	2.20	2.20	2.10	2.30
Sheets, galv., No. 24, P'gh	2.70	2.70	2.70	2.85
Sheets, galv., No. 24, Chicago dist. mill	2.80	2.80	2.80	2.95
Hot-rolled sheets, No. 10, P'gh	1.50	1.50	1.40	1.55
Hot-rolled sheets, No. 10, Chicago dist. mill	1.60	1.60	1.50	1.65
Wire nails, Pittsburgh	1.85	1.85	1.85	1.95
Wire nails, Chicago dist. mill	1.90	1.90	1.90	2.00
Plain wire, Pittsburgh	2.10	2.10	2.10	2.20
Plain wire, Chicago dist mill	2.15	2.15	2.15	2.25
Barbed wire, galv., Pittsburgh	2.35	2.35	2.35	2.60
Barbed wire, galv., Chicago dist. mill	2.40	2.40	2.40	2.65
Tin plate, 100 lb. box, P'gh	$4.25	$4.25	$4.25	$4.75

Old Material				
Per Gross Ton:				
Heavy melting steel, P'gh	$11.75	$11.50	$12.25	$9.00
Heavy melting steel, Phila	9.25	9.25	8.75	6.25
Heavy melting steel, Ch'go	8.75	8.50	8.50	6.25
Carwheels, Chicago	9.50	9.50	8.50	6.25
Carwheels, Philadelphia	10.25	9.75	9.75	9.00
No. 1 cast, Pittsburgh	10.50	10.50	10.50	9.00
No. 1 cast, Philadelphia	10.25	10.25	10.25	8.00
No. 1 cast, Ch'go (net ton)	8.75	8.75	8.00	6.50
No. 1 RR. wrot., Phila	10.75	10.75	10.75	8.50
No. 1 RR. wrot., Ch'go (net)	6.50	6.50	6.00	3.75

Coke, Connellsville				
Per Net Ton at Oven:				
Furnace coke, prompt	$1.75	$1.75	$1.75	$2.00
Foundry coke, prompt	2.50	2.50	2.50	3.00

Metals				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Electrolytic copper, refinery	7.75	7.25	6.50	5.12½
Lake copper, New York	8.00	7.50	6.75	5.50
Tin (Straits), New York	42.12½	39.25	36.00	19.87½
Zinc, East St. Louis	4.30	4.20	3.75	2.82½
Zinc, New York	4.67	4.57	4.12	3.19½
Lead, St. Louis	3.95	3.75	3.52½	2.90
Lead, New York	4.10	3.90	3.65	3.00
Antimony (Asiatic), N. Y.	6.35	6.25	6.25	5.12½

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

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▲▲▲ The Iron Age Composite Prices ▲▲▲

	Finished Steel	Pig Iron	Steel Scrap
June 6, 1933	1.892c. a Lb.	$15.01 a Gross Ton	$9.92 a Gross Ton
One week ago	1.892c.	15.01	9.75
One month ago	1.867c.	14.33	9.83
One year ago	1.970c.	14.01	7.17
	Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot rolled strip. These products make 85 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago, Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel		Pig Iron		Steel Scrap	
	High	Low	High	Low	High	Low
1933	1.948c., Jan. 3	1.867c., Apr. 18	$15.01, May 29	$13.56, Jan. 3	$9.92, June 6	$6.75, Jan. 3
1932	1.977c., Oct. 4	1.926c., Feb. 2	14.81, Jan. 5	13.56, Dec. 6	8.50, Jan. 12	6.42, July 5
1931	2.037c., Jan. 13	1.945c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15	11.33, Jan. 6	8.50, Dec. 29
1930	2.273c., Jan. 7	2.018c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.317c., April 2	2.273c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.286c., Dec. 11	2.217c., July 17	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.402c., Jan. 4	2.212c., Nov. 1	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22

Pittsburgh Steel Production Rises to 32 Per Cent Rate

Evidence of Contraction in Demand Lacking—Mills Discourage Forward Contracting Because of Uncertainty of Costs—Scrap Stronger

PITTSBURGH, June 6. — With evidences of contraction in finished steel demand entirely lacking in this district, steel ingot production has risen further with the prospect that June output will exceed the May total.

Buying and new inquiry by the railroads has been the feature of the market in the past week, and there has been some additional expansion in miscellaneous finished steel demand. Shipments to the automotive industry are holding their own, but building as measured by structural steel and reinforcing bar awards continues to lag. Tin plate specifications are holding up, but pressure for deliveries is not so pronounced, and production is slightly lower at 85 per cent of capacity. Sheet output has passed the 40 per cent level, and strip production is well maintained at 35 per cent.

Steel ingot production in the Pittsburgh district will average 32 per cent this week, considering additional productive capacity which is now scheduled to be brought in. Another Steel Corporation blast furnace has been lighted, and a second is expected to come in within a week. A large Bessemer plant is also prepared for production. The leading independent has increased its output, and two or three smaller interests are adding open-hearth furnaces. In the Valleys and nearby northern Ohio, steel ingot output will average 50 per cent of capacity for the week, although there has been some shifting of tonnage from one plant to another, which has brought temporary setbacks. Wheeling district output has risen to 85 per cent.

New buying of finished steel products, particularly for third quarter, is being discouraged by steel producers, who have opened their books for that period only on strip steel and to some extent on sheets. The uncertainty of manufacturing costs in the second half of the year as a result of the Industrial Recovery bill now being considered by Congress is the reason for delay. Wage rates have already been increased by coal producers, refractory makers and bolt and nut manufacturers. In most cases advances in compensation have been accompanied by higher asking prices for the resultant products.

Ferromanganese prices for spot delivery have been increased $4 a ton, and refractories quotations are $5 higher. In no cases are the new figures applicable to third quarter business. Pig iron quotations are well sustained, and the scrap market has developed a stronger undertone.

Pig Iron

Although little new buying is reported in this district, shipments against old contracts are well maintained, and carload lot purchases indicate that the recently established prices of $15, Valley furnace, for basic, $15.50 for foundry and malleable, and $16 for Bessemer, are well established. No large sales have been made to test these figures. The Pittsburgh district furnace is quoting prices 50c. a ton higher.

Ferroalloys

The leading maker of ferromanganese has advanced the spot price $4 a ton to $72 duty paid, tidewater. The contract price is unchanged, and the new quotation applies only to June orders.

Refractories

Leading makers have again advanced the price of refractory materials, the new quotations to be effective immediately, but only for the month of June. First-quality fire clay brick is now quoted at $40 a 1000, with second quality at $35. Pennsylvania silica brick is also up $5 a ton to $40, while malleable bung brick has been advanced by a similar amount. Silica brick has also been advanced in the Chicago district. Refractory makers are engaged at about 50 per cent of capacity, and generally report a constantly expanding demand. Wage rates in the brick plants have also been advanced.

Semi-Finished Steel

With mill order books not yet open for third quarter, the market is experiencing little activity. Shipments of billets, slabs and sheet bars are well sustained, with the spot price holding at $26, Pittsburgh or Youngstown. Forging billets are also moving well and demand for wire rods is holding its own.

Rails and Track Accessories

The New York Central has purchased 7000 tons of rails, the business having been divided between the subsidiaries of the United States Steel Corpn. and the Bethlehem Steel Co. It is not believed likely that much of the tonnage will be rolled in the Pittsburgh district. The Norfolk & Western has not closed against its inquiry for 10,000 tons of rails, but has placed 6000 kegs of spikes and 3500 tons of tie plates. The Seaboard Air Line is in the market for 11,000 tons of rails. Releases of track accessories are well sustained, but show no particular expansion. Recent buying and inquiry for rails by the carriers is thought by some to be the forerunner of a general buying movement, but is more logically explained by recent increases in freight traffic which are forcing the carriers to meet their current needs.

Bolts, Nuts and Rivets

The recent price advance in bolts has brought some new business into the market, and has resulted in increased specifications against old contracts. Makers are unwilling to quote beyond July 1, and may not open their third quarter books for several days. Rivet prices continue unchanged.

Bars, Plates and Shapes

Gradually improved inquiry for structural steel is a favorable factor in the market for heavy hot-rolled products, but the Chicago Great Western's order for 500 freight cars last week is the center of attention. Although this business went to a Chicago district car builder, it was the first sizable car purchase reported since October, 1931, if equipment produced in company shops is excepted. A Pittsburgh district car company has taken a small order for observation cars for the Century of Progress. If additional rolling stock is contemplated by the carriers, their secret is well guarded, as no definite inquiry is before the trade. Steel plate demand has also received impetus from the barge market, with the placing of eight barges, requiring 900 tons of plates, by a local river transportation company. Considerable additional barge inquiry of an indefinite sort is still before the trade. Reinforcing bars are quiet, although demand for merchant and alloy steel bars is well sustained, with expansion reported by some companies. Bar mills in the district are engaged at about 35 per cent of capacity, which is a considerably higher rate than has been attained by plate and shape mills.

Third quarter prices on heavy hot-rolled products are still unnamed, with final decision probably resting upon the passage of the Industrial Recovery bill now before Congress. It is believed likely that a wage increase would accompany any upward revision in quotations. The current market on bars and shapes is fairly well maintained at 1.60c., Pittsburgh, but plates are still quotable at 1.50c. to 1.60c. Reinforcing bar prices are stronger, with distributers' quotations on mill lengths now generally holding at 1.60c., Pittsburgh. Cut lengths take the usual $3 a ton advance.

Cold-Finished Steel Bars

May tonnage showed a substantial increase over April, and the new

month is starting out well. Makers have not opened their third quarter books, but are urging consumers to specify against old contracts in anticipation of an advance.

Tubular Goods

Demand for pipe has failed to expand to a marked extent, although aggregate movement is running well ahead of the low levels of early spring. Jobbers are still inclined to build up their stocks, but financing difficulties are a deterring factor. No line pipe inquiry of importance is reported. Mechanical tubing and boiler tubes are still more active than the other lines of tubular goods. A change in boiler tube discounts, which would advance the price slightly, is in prospect, but has not been definitely announced.

Wire Products

Releases from the merchant trade are expanding and are expected to gain further momentum as the end of the month approaches. According to the new month-to-month selling policy, which has been definitely adopted by producers, all material on present contracts must be specified by June 30 for shipment prior to July 15. Makers are not committing themselves further ahead with regard to price. Manufacturers' wire is moving steadily to the automotive industry, and spring manufacturers are busier. The current prices of $1.85 a keg on nails and 2.10c. a lb. on manufacturers' wire are well sustained.

Tin Plate

Specifications continue to come in in good volume, although the pressure for urgent shipments, noticeable a week or two ago, has been relaxed slightly. Under the circumstances, operations are estimated this week at 85 per cent of capacity, a slight decline from the previous fortnight. No intimation of the second half price has been heard, but a change would not be of much significance considering the fact that at least two-thirds of the industry's total consumption is already contracted for over the entire year.

Sheets

Releases are holding up well, with gains still reported by some companies. Further diversification of demand is also emphasized. The automotive industry has not been increasing its requirements for several weeks, and yet aggregate demand has been growing steadily. Electric refrigerator makers are still taking sizable tonnages, and demand for electrical sheets is heavier. Radio makers are also more active consumers, and jobber buying is more of a factor. In the case of the latter, however, mills are refusing to depart from regular credit terms and are thus forestalling a certain amount of speculative stocking. Consumers are attempting to cover their third quarter requirements, but many producers are now following the example of the leading interest in refusing to commit themselves beyond June 30. A little tonnage has been taken for the third quarter at the recently advanced prices, but the uncertainty of wage rates during that period has made producers reluctant to quote. Some tonnage is being bought for shipment prior to July 15, but releases against old contracts constitute the bulk of current tonnage.

Strip Steel

Demand is well sustained, although no further expansion in tonnage has occurred in the last week. The industry is now running at about 35 per cent of capacity, with enough tonnage accumulating from week to week to enable satisfactory operating schedules to be arranged. Some third quarter business in hot-rolled strip has been booked at the 1.60c., Pittsburgh, price. The 2c. price on cold-rolled has received little test, although nearby producers are not even booking current tonnage at lower figures.

Coal and Coke

Makers of domestic coke are working on a price stabilization plan similar to that being introduced into the coal industry. Adoption of the arrangement may be possible before next season's business gets under way. Shipments of foundry coke are heavier, but little new buying is reported. The Chateaugay furnace in New York State has covered its coke requirements, beginning July 1, with a nearby producer. The coal market continues rather quiet, although industrial and railroad demands are improving.

Scrap

Sale of the recent railroad lists, with No. 1 heavy melting steel bringing $12.25, has given the scrap market a stronger tone. Some of the material on the lists went to the Youngstown district, but a part will move to Pittsburgh district consuming points. Dealers are unable to buy No. 1 steel for less than $11.25, and the market thereby becomes quotable at a wide range 25c. over recent quotations. Hydraulic compressed sheets are strong and very scarce in this district. No 2 steel is rather quiet, but machine shop turnings as well as the blast furnace grades are stronger on the basis of high dealer bids at two or three points. The foundries are not yet buying heavily, but small sales are bringing prices fully in line with recent quotations.

Southern Steel Output Highest in 15 Months

BIRMINGHAM, June 6.—The three merchant producers of pig iron in this district shipped more than their current make during May, the first time in a long while that all have done so at the same time. May proved to be the best month of the past 12 from the standpoint of shipments. So far this month the volume has been maintained. Most of the iron being taken is for immediate melt, which reflects the pickup that has taken place in foundry operations throughout the month.

All branches of the foundry trade, with the exception of pipe, have contributed to the gain. However, an advance in pipe has been made, this becoming effective on Monday of this week. The new quotations are $35 a ton for 6-in. and larger, on 200 tons and more; $36 a ton for smaller tonnages. The former prices were $32 to $33.

Spot sales of pig iron are light, due to the fact that foundries have already bought for this quarter, but third quarter tonnage is gradually growing and many melters are now covered for the next period. The base price for spot iron and for the third quarter remains at $12. No business is being taken by the furnaces at this time for the fourth quarter. Four blast furnaces are operating, a gain of two having been made during May. Three are on foundry iron and one on basic. It is likely that during the present week Republic Steel Corpn. will change its stack from foundry iron to basic. Republic Steel Corpn. is relining its No. 1 stack.

Another upward revision in scrap prices has been made.

Steel

Open-hearth operations last week touched not only the highest point of the year but the highest since May, 1932, and ingot production for May was the largest since February, 1932. Eleven open-hearths were active last week and the schedule for this week is the same. Throughout May the number of active open-hearths ranged from 7 to 11.

Sales by one steel producer were the best in over a year. The new business was varied and well distributed among all lines. Sheets, wire products, bale ties and other lighter products are maintaining a good demand. Railroad buying also showed improvement last month. Bookings of the past week continued at a favorable rate. Prices are unchanged but there is talk of another price advance in sheets for the third quarter. The Ensley rail mill of the Tennessee Coal, Iron & Railroad Co. operated last week, but is now idle for another period.

Rising Demand Carries Chicago Operating Rate to 42 Per Cent

Requirements of Automobile Industry Have Ceased to Expand But Increasing Business Is Coming From Other Sources

CHICAGO, June 6.—Demand for steel continues to rise, but the curve is tending to flatten out, with ingot output now ranging from 41 to 42 per cent of capacity. Consumption of steel in automobile manufacturing centers is stationary in so far as Chicago mills are concerned and increased demand is coming from miscellaneous sources. Railroad buying is showing signs of reviving, the high light being an order of 500 cars placed by the Chicago Great Western. It is estimated here that fully 40 per cent of railroad rolling stock is unfit for immediate service and as car loadings rise the railroads give evidence of this situation by ordering more repair parts.

The market as a whole is still characterized by close buying, although it is not without its speculative features. Sellers, in giving close attention to opportunities to advance prices, are cautious and few commitments for third quarter have been recorded. Such advance sales as have been made are for tonnages for actual jobs, so that the mill is assured that full specifications will be issued within a given time. One group within the steel industry is selling only for 30 days' basis and is carrying present prices forward on that basis. The plate market is more active under the leadership of brewers who need aging tanks and light plates for beer kegs. The prospects for oil country tonnages are still considered good, though not for the extreme short range.

Pig Iron

Specifications for Northern foundry iron continue to climb and it is interesting to note that sales are not keeping pace. Sellers interpret this to mean that a new wave of buying is due, which will surpass any similar movement that has been experienced so far this year. Tonnages purchased in April and early May for delivery in June and July are now being taken out. One furnace remains active. Although stock piles are shrinking there is as yet no difficulty in making prompt shipments of grades desired. Specifications for charcoal iron are larger. Propositions on Southern iron are still being submitted to furnaces and prices are being adjusted to conform to quotations made by Northern furnaces at the various points of competition.

Cast Iron Pipe

Producers are contemplating advances of about $3 a ton. Diameters of 6 in. and larger are now quoted $33 a ton, Birmingham, and the rise in prices would result in quotations of $36 a ton, Birmingham, or $44.40, delivered Chicago. About 300 tons has been ordered for the Wilmette, Ill., pumping plant. On the whole, the market is quiet and from all indications, will remain so until more Federal funds become available for public works.

Reinforcing Bars

Mills are holding to recent advances to dealers who yet have some distance to go toward stabilizing prices. From all indications, the State of Illinois is near agreement with producers of cement. Substantial tonnages of bars will be released as soon as the argument over cement prices is settled. Indiana has some more road work to place but is holding back, waiting for its share of Federal aid. The market as a whole is quiet. Some miscellaneous small-lot business is being placed, but the bulk of the tonnage is for public work. A few small private inquiries have recently come into the market.

Bolts, Nuts and Rivets

Prices for bolts and nuts are being advanced, but third quarter quotations are not yet available. Nuts are now quoted 73 per cent off list and stove bolts in packages are being quoted 72½, 25 and 10 off list, while in bulk the new discount is 85 per cent. Business remains rather spotty but the aggregate of all orders is larger.

Tin Plate

Local mills are engaged at capacity and one unit is producing about 10 per cent above its practical rating. Work has started on Inland Steel Co.'s new tin mill and Youngstown Sheet & Tube Co. is letting contracts for an addition to its Indiana Harbor tin mill.

Bars

Demand continues to expand and output has reached as high as 50 per cent of capacity at some rolling mills. Third quarter price announcements have not been made and sellers are pursuing different policies as to commitments for delivery after July 1. Some producers have taken business at current prices for delivery in the third quarter. Other sellers will take such commitments only for actual specification and shipment in full within a stated time. Still others appear to be holding rigidly to the policy of accepting no orders for shipment after July 1.

The month of May for rail steel bar mills was the best in a year and a half, and demand is still turning upward in spite of the dullest fence post season in several years. Deliveries are now beginning to be a factor in the market.

Plates

Outstanding in new business is the Chicago Great Western's order for 500 all-steel box cars, requiring 6500 tons of rolled steel for superstructures and about 3500 tons of miscellaneous steel and castings. Brewers continue to buy tanks, and thin plates are moving in substantial volume to beer keg manufacturers.

Wire Products

The manufacturing trade continues to expand and wire mill output has reached 50 per cent of capacity. The automobile industry still holds first place among consumers. An unusual situation is that consumption in farm areas is holding steady as June starts. Some sellers are declining to announce third quarter prices and instead are extending current quotations through the month of July. In fact, the idea is spreading that under present conditions three months is not desirable as a contract period.

Rails and Track Supplies

About 5000 tons of the 7000 tons of rails placed by the New York Central will be rolled at Chicago. No new rail programs are being planned in this area. There is a moderate gain in track supply specifications, but the tonnage is in keeping only with emergency repair work.

Sheets

Output is holding at 50 per cent of capacity and some delivery dates have been pushed forward three weeks. Not all producers have followed the lead of Inland Steel Co. in announcing higher prices for third quarter, but they are limiting commitments to deliveries up to July 1.

Structural Material

Awards are impressive at 5000 tons, including 1400 tons for Inland Steel Co.'s new tin mill. Fresh inquiries are small, but Youngstown Sheet & Tube Co. will soon be out for a tonnage for an addition to its tin mill.

Scrap

Heavy melting steel has advanced 25c. a ton to $9 a gross ton, delivered consumers' yards. Recent sales have been small but they definitely reflect market strength. Demand for specialties is light and cast iron grades are moving in small quantities. One large consumer of scrap has been sending inspectors to country dealers from whom purchases are being made. Considerable trouble has recently been experienced due to rejections of country scrap upon arrival at local mills.

New York District Bookings Make May a Banner Month

Price Increase on Galvanized Sheets Not General—Rail Steel Bars and Mesh Are Advanced

NEW YORK, June 6.—The flow of orders, including specifications on contracts, has been fully up to the levels of the last several weeks, and, in the case of some companies, actually higher. Rarely, however, is a sales item reported of any notable size, but instead there is a broad diversified demand covering all forms of finished steel with a widening possibly in the heavy tonnage lines, including plates. Bookings in May were double those of April in some lines; one New York district office found such a ratio of improvement in bars and a 70 per cent increase in tin plate, the latter more significant in that the April sales volume was fairly large.

An advance of $3 a ton has been announced by a number of makers of galvanized sheets, effective immediately and raising the Pittsburgh base to 2.85c. for No. 24 gage, or $5 a ton higher than governs much of the tonnage going into current consumption. Mills that have not as yet joined in the price advance have not indicated their intentions, but are said to await the outcome of the pending industrial recovery legislation. It remains that the marking up of galvanized sheets, which had been left unchanged when higher prices were named for other sheets and strips, has elicited no surprise, as both buyers and sellers have been openly looking for higher quotations. Few sellers have taken any initiative looking to any third-quarter selling, and for that matter the pressure from buyers for protection for that period has been inconsequential.

Among the notable orders of the week was one for some 250 tons of alloy steel. About 1000 tons of plates will be required for the pipe lines for the Rip Van Winkle bridge at Catskill, N. Y.

Pig Iron

Pig iron sales have subsided, total bookings for the week amounting to only 3500 tons as compared with 6000 tons last week and 12,000 tons a fortnight ago. Many melters have covered their third quarter needs at the present rate of consumption but will need additional iron if their operations improve. Inquiries for fourth quarter have been received, but domestic producers are disinclined to commit themselves that far ahead. May shipments of pig iron showed a measurable gain over April and were fully twice as large as those of March. Deliveries are continuing at a good rate, although foundries are not pressing for material. Melt in this territory shows scattered signs of improvement but has not increased in keeping with the recent gain in pig iron buying. A barge load of iron was recently moved from Buffalo to New York but to date the movement over the canal has not been large. The price situation remains substantially unchanged so far as domestic producers are concerned, with Southern furnaces following the policy of quoting delivered prices 50c. below competing Northern quotations. Foreign quotations are somewhat indefinite owing to exchange instability but quotations of $14 to $14.50, duty paid, port of entry, are reported to be still outstanding.

Reinforcing Bars

Construction projects requiring reinforcing bars are still few in number. A revival of demand apparently hinges on the launching of the Government public works program. Quotations of 1.60c. a lb. for mill lengths, and 1.75c. a lb. for cut lengths of concrete bars, f.o.b. Pittsburgh, are well maintained. Rail steel bars have been advanced $4 a ton from 1.30c. a lb. to 1.50c. a lb., Buffalo, effective immediately. Mesh has also been advanced, the discounts having been decreased from 20 per cent to 10 per cent off list. The Frederick Snare Corpn., New York, is low bidder on the general contract for the Rip Van Winkle Bridge at Catskill, N. Y., requiring 300 tons of concrete bars and 900 tons of welded bar trusses.

Cast Iron Pipe

An advance of $3 a ton was effected yesterday. Six-inch and larger sizes are now quotable at $38.30 a net ton, delivered New York. Demand is relatively light and reflects a general lag in municipal projects. Public utility purchasing is also meager.

Scrap

There have been few new consumer sales and prices have undergone little change. Shipments are going forward steadily to eastern Pennsylvania mills and by barge to Buffalo plants. The available supply of scrap is none too large and holders are in no haste to sell at current levels. Foreign purchases have ceased because of higher prices and dollar depreciation, but shipments are still being made. Foundries, particularly malleable plants, are taking more interest in scrap, and railway supply manufacturers are commencing to lay in supplies in anticipation of a revival of railroad buying.

Warehouse Differentials Revised at Boston

BOSTON, June 6.—Local warehouses have put into effect new quantity differentials on hot-rolled steel products. The base price, which is unchanged, is for lots of 400 to 999 lb. A reduction of 20c. is allowed on lots of 1000 to 4999 lb.; of 40c. on lots of 5000 to 9999 lb.; of 60c. on 10,000 to 39,999 lb., and of 75c. on 40,000 lb. and over. For lots of 399 lb. and smaller, 50c. per 100 lb. is added to the base price.

Pig iron sales the past week approximated 1500 tons, and embraced Mystic, Buffalo, Alabama and foreign brands. Most of the iron is for second quarter delivery, but some of it extends into the third quarter. The readjustment of Buffalo and Alabama iron prices to conform as nearly as possible to Mystic has caused some confusion among sellers, as well as prospective buyers. There is no open business of any size in the market.

A further shrinkage in the scrap business is noted, with prices holding well at the slight concessions recently put into effect. Quotations on engine blocks take an exceptionally wide range, $2.50 to $3.50 a ton, on cars shipping point. Recent sales included moderate tonnages of heavy breakable at $4.50 a ton, shipping point, No. 2 steel at $4, and No. 1 heavy melting steel at $5.25, all for Pittsburgh district delivery. Brokers expect no improvement in business this month, but do look for a betterment in July.

A slight increase in by-product foundry coke shipping instructions reflects the larger New England melt previously reported.

Buffalo Rate Unchanged at 33 Per Cent

BUFFALO, June 6.—Aggregate inquiry for pig iron is between 3000 and 4000 tons, with most of the larger consumers satisfied for the time being. Prices are firm and are working rapidly toward a $15 minimum in the East. Melt is increasing and shipments are improving.

Steel

Operations continue without change. The Lackawanna plant of the Bethlehem Steel Corpn. is operating seven open-hearths, Republic Steel Corpn., four, and Wickwire-Spencer, one. The Seneca sheet division of Bethlehem is running at about 30

per cent. Wire business is on the upgrade. The New York Central will build a viaduct at Corning, N. Y., calling for 330 tons of structural steel. The Frederick Snare Corpn., New York, is low bidder on the general contract for a bridge over the Hudson at Catskill, N. Y., which will require a substantial tonnage of structural and reinforcing bars.

Scrap

The market is active with selling proceeding under a wider range of prices. One dealer sold 1000 tons of No. 1 heavy melting steel and No. 2 heavy melting steel to a mill which had not been in the market for some time at $9 for the No. 1 and $8 for the No. 2. At the same time a sale of No. 2 steel was reported to another mill at $8.50. A large consuming interest is now offering $9 and $7.50 respectively, but stocks are being closely held and very little scrap is available at these prices. This interest is understood to have acquired 10,000 tons over a period of a couple of weeks at $10 and 2000 or 3000 tons of No. 2 at $9.50. This mill has suspended shipments.

Large Tower Jobs to Be Figured on Coast

SAN FRANCISCO, June 5.—Activity is increasing among the mills on the Coast because of industrial demands, even though building construction, due largely to the postponement of pending Federal projects, is at a minimum. Railroads are buying no steel with the exception of small tonnages for trestles. The heavy export of scrap to the Orient continues both because of small local demand and unusually favorable freight rates. Plates show signs of strengthening while an increase on sheets is anticipated. Jobber out-of-stock sales continue to be more active.

It is reported that bids are to be taken soon by the Los Angeles Water and Power Commission for transmission lines which will require 28,000 tons of structural steel for towers. In addition, the Metropolitan Water District will use 20,000 tons for towers on the Colorado River project, but bids will not be taken for a considerable time. Bids have been received on 4300 tons of plates for conduit pipes for Bouquet Canyon Dam in Los Angeles. At Seattle, bids are being taken on June 8 on the Mount Diablo power house and transmission lines requiring 660 tons of shapes. The Pacific Coast Steel Corpn. took 730 tons of bars for the San Francisco County jail. Several sub-contracts for considerable steel tonnage for the San Francisco-Oakland bridge are expected to be placed in the near future.

Eastern Pennsylvania Steel Trade Awaits Legislation

Action on Prices Suspending Pending Fulfillment of Washington Program—Ingot Output Unchanged at 22 Per Cent

PHILADELPHIA, June 6.—The local steel trade is centering its interest in developments at Washington. Particular attention is directed to the Wagner bill, passage of which is held essential before third-quarter prices can be definitely established. Steel executives here are of the opinion that as soon as the bill is passed marked increases in prices will follow. Meanwhile, some consumers, who find it necessary to plan their operations for July, have exerted pressure for third-quarter quotations, with the result that in one or two cases prices for that period have been made on a qualified basis. The qualifications, broadly, provide for absorption by the consumer of any increases in manufacturing, selling or transportation costs that may result from State or Federal legislation.

Specifications against second-quarter contracts are considered satisfactory. Considerably more tonnage would be driven in, it is believed, if third-quarter prices were established. Sheet demand continues to get its chief impetus from the automotive industry. Heavy rolled products, in comparison with the lighter grades, are quiet. Prospects for revival of railroad buying are brightened by the approval yesterday by the House of the Rayburn measure for railroad rehabilitation. Structural mills still pin hopes on the prospective public works bill.

The recent upswing in open-hearth operations has evidently been checked, and the steel ingot output for this district remains unchanged at about 22 per cent of capacity.

Ferromanganese for spot delivery was advanced $4 a ton last week to $72 a gross ton, seaboard. For contract shipment to June 30 the price is unchanged at $68.

Pig Iron

Current demand is restricted to car lots. Despite the absence of major buying, prices are firm. Although shipments to foundries in the latter part of May reflected an improvement over those in the preceding month, acceptances against contracts are still considered to be lagging. With the important users of foundry and basic grades covered well into third quarter, little large-lot buying is in immediate prospect. Quotations on Indian iron are understood to be made at relatively sharp increases over recent schedules. A good part of the advance is attributable to dollar depreciation.

Sheets

The bulk of demand continues from the automotive industry. Miscellaneous requirements are also well sustained. Jobbers are not very active buyers at present. Mills are maintaining their recent satisfactory rate of operations. Prospects for a continuation of the present rate of activity are sustained by expectations of generous releases against second-quarter contracts following establishment of prices for the ensuing period. While one mill has instituted an advance on galvanized to 2.85c., effective immediately, that grade is still available at 2.70c., Pittsburgh.

Plates, Shapes and Bars

A fairly steady flow of small-lot orders for plates and merchant bars continues. Approval yesterday by the House of the railroad rehabilitation measure has brightened the outlook for replacement buying by the carriers, though any broad purchasing program is not considered likely to occur before early fall. Structural requirements, while still light, are expected to expand soon with the prospective release of public works projects. Reinforcing bars are quiet, though firm, at 1.50c., Pittsburgh, for cut lengths.

Warehouse Business

Jobbers continue to enjoy a satisfactory flow of orders. Prices are notably firm at unchanged levels.

Imports

The following iron and steel imports were received here last week: 901 tons of pig iron from British India, 37 tons of steel bars from Belgium and 3 tons of galvanized steel strips from England.

Scrap

Movement of heavy melting steel on contracts continues at a brisk pace. Fresh buying, however, is light. Recent sales have established No. 1 forge fire at $8 to $8.50, and cast-iron carwheels at $10 to $10.50, reflecting advances of $2.50 and 50c. a ton, respectively.

The Pottsville Bolt Co., Inc., Pottsville, Pa., will hold a public sale of certain parcels of its real estate holdings at Pottsville on June 16, at 2 p. m.

Ingot Output Reaches 65 Per Cent in Cleveland District

Steel Bookings for June Expected to Exceed Those of May—Quarterly Covering May Be Discontinued

CLEVELAND, June 6.—Orders for finished steel made further gains during the week and a larger volume of business is expected in June than during May. The automotive industry continues to take a heavy tonnage of bars, sheets and strip steel and the demand from miscellaneous sources has further expanded. The present impetus has been attained with little tonnage from the railroads and building industries and none from Lake shipyards, three important consuming industries.

Ingot output in the Cleveland territory made a sharp advance of 11 points this week, the Cleveland and Lorain plants now operating at 65 per cent of capacity. The Corrigan, McKinney and the Otis Steel companies each put on an additional open-hearth furnace and the Lorain plant added three furnaces, the latter now operating all 12 or at 100 per cent of capacity.

With the announcement of third quarter prices on heavy rolled products still deferred and with several producers delaying the naming of prices on sheets and strip steel for the coming quarter, the possibility that prices will be named only from month to month or for immediate specifications is being widely discussed. Under the pending plan of Federal industrial control, steel makers are uncertain as to what extent their production costs will advance and for that reason are hesitating about making commitments for three months. Prices generally are very firm and an advance of $4 a ton has been made on rail steel reinforcing bars. Bolts and nuts have also been advanced.

The city of Toledo shortly will take bids for construction work requiring 1600 tons of steel piling. The local United States divisional engineer's office is working on projects that will require 5500 tons of piling.

Pig Iron

Sales locally and in outlying territory have improved, a considerable number of orders for moderate and small tonnages having been booked for delivery extending through the third quarter. There is not a great deal of activity in the surrounding district. Cleveland interests sold 6000 tons during the week. Pending inquiries include two 1000-ton lots. Shipments in June are expected to be considerably heavier than in May. Foundries are getting a better volume of castings orders from railroads for repair work and there has been a pick-up in business from the oil industry. Demand from the automotive industry is being maintained. Prices are firm.

Iron Ore

Water shipments from upper Lake ports during May increased to 900,534 tons, a gain of 789,708 tons over May last year. The movement until June 1 was 983,744 tons, as against 154,899 tons during the same period last year. A large part of the ore shipped last month was moved by the United States Steel Corpn., which did not start its boats last year until July.

Sheets

Demand is holding up to recent good volume. Heavy specifications came from the automotive industry during the week for June requirements. Orders from the electric refrigerator manufacturers continue good and this industry is expected to maintain heavy production for some time. Washing machine manufacturers are also busy and the demand from stove manufacturers and jobbers has improved. While some inquiry for the third quarter has come from miscellaneous users, automobile manufacturers are not yet showing interest in the coming quarter and there has been no test of prices for that delivery, for which some mills have announced an advance of $3 a ton.

Strip Steel

Heavy specifications for both hot and cold strip for June shipment have been issued by the automotive industry, particularly General Motors units, and miscellaneous demand has increased. Beer case makers continue to order considerable material and a good demand for cold strip has developed from manufacturers of household electric appliances and toys. Most hot strip consumers have protection at 1.45c., but miscellaneous new business is being taken at 1.55c. While some producers have named 1.60c. for the third quarter, several mills have not announced prices for that delivery. Cold-rolled strip is unchanged at 1.80c. to 2c.

Bars, Plates and Shapes

Demand for merchant bars continues very active. Orders from the automotive industry are holding to recent volume and business from miscellaneous consumers has gained. Some business is now coming from the agricultural implement industry. Plate orders from boilermakers have improved, and there is still some demand for plates for brewery tanks. The Erie Railroad has placed 1785 tons of structural material for an Elmira, N. Y., bridge. Other structural work is limited to small lots.

Reinforcing Bars

An advance of $4 a ton to 1.50c. mill, over the recent price has been made on rail steel reinforcing bars. This advance puts the price on the same basis as new billet steel reinforcing bars, which a local mill recently advanced to 1.50c., Cleveland, for mill lengths to recognized distributers. This local producer has advanced billet steel reinforcing bars to 1.65c., Cleveland, to all but distributers, making them the same price as merchant bars. Cleveland has asked for bids for the Parma reservoir, requiring 1400 tons.

Bolts and Nuts

A price advance to 73 per cent off list has been made on bolts and nuts for delivery to July 1. No price has yet been named for the third quarter. Stove bolts have been advanced from 7 to 10 per cent, now being quoted at 72½, 25 and 10 per cent discount for packages and 85 per cent off list for bulk.

Scrap

Purchases of substantial tonnages of steel-making scrap were made during the week by Youngstown district mills and this has given the local market a somewhat firmer tone, although prices are unchanged. A Cleveland consumer is expected to come into the market in a day or two for steel-making and blast furnace scrap for June requirements. This consumer during the week received a small cargo of scrap from a Lake Michigan port.

Canadian Iron and Steel Remains Quiet

TORONTO, ONT., June 6.—While there has been no definite turn for the better in the Canadian iron and steel industry some bright spots are beginning to make their appearance. Announcement was made this week that Canadian Car & Foundry Co. will resume operations at its plant at Amherst, N. S. The company recently received a contract for 150 tank cars from the British American Oil Co. Companies producing mining equipment are actively engaged and report a steady flow of new business from various mining fields in Ontario, Quebec, Manitoba and British Columbia. Equipment is being assembled for a silver concentrator to be shipped into the Great Bear Lake district, Northwest Territories, for Eldorado Gold Mines. The automotive

industry is maintaining production and General Motors has increased its staff at Oshawa.

Pig Iron

Sales in this market showed some minor improvement during the week. Melters, however, are taking iron for spot needs only and are not placing future delivery contracts. Individual sales are confined to single car lots, with bookings for the week up about 200 tons from the previous week's total of about 500 tons. Pig iron production is at a standstill with no stacks active. Imports are negligible, and local blast furnace representatives state that they have no competition from United States producers. Prices are firm, but unchanged.

Scrap

Recent reductions in scrap prices failed to bring any change for the better in demand. Both Toronto and Montreal dealers report stagnation in sales insofar as business for domestic consumption is concerned. There is a fair demand for steel scrap for export. Dealers' yards are heavily stocked with most grades of scrap, while shipments are irregular and in small tonnages. Prices are unchanged.

May Is Banner Month in Iron Sales at St. Louis

ST. LOUIS, June 6.—May sales of pig iron by the St. Louis Gas & Coke Corpn. were the best of any month for the last year and a half. Sales last week totaled several thousand tons. Specifications against contracts continue heavy. Basic iron is beginning to move, but melters are buying only for current needs, and are not yet making contracts. Prices continue firm.

Steel

Open-hearth operations in the St. Louis industrial district were stepped up further this week to about 40 per cent of capacity.

Light steel products, such as sheets, bolts, nails and wire, are experiencing a brisk demand. Interest in structurals is light, with the only demand coming from Government projects. Bands are up $2 a ton, thus placing this item on the same basis as bars. Prices generally are firm.

Scrap

More than 20,000 tons of scrap has been bought by mills in the St. Louis industrial district during the last 30 days. There was some buying during the last week. An increase in orders, a better outlook for business and a belief that prices will advance further promoted the making of purchases. Foundry grades advanced again, steel angle bars, railroad malleable and stove plate moving up 50c. a ton, cast iron car wheels $1, and No. 1 railroad cast 75c.

Reinforcing Steel

Awards 2250 Tons—New Projects, 3650 Tons

Providence, R. I., 200 tons, building for Providence *Journal*, to Truscon Steel Co.

New York, 500 tons of bars and 200 tons of mesh, Knickerbocker Village; placed by Fred F. French Co. with Kalman Steel Co.

Brooklyn, 100 tons, Swift & Co. warehouse, to Concrete Steel Co.

Long Beach, Cal., 100 tons, Buffum's department store, to Pacific Coast Steel Corpn.

Camarillo, Cal., 100 tons, units 1 and 5 of State hospital, to Blue Diamond Corpn., Ltd.

San Francisco, 730 tons, County jail, to Pacific Coast Steel Co.

Fairbanks, Alaska, 131 tons, school, to an unnamed bidder.

Panama Canal Zone, 380 tons, Government construction, to Jones & Laughlin Steel Corpn.

NEW REINFORCING BAR PROJECTS

New York, 750 tons, west side viaduct from St. John's Park Terminal to West Eighteenth Street; bids to be taken by New York Central Railroad June 13.

Catskill, N. Y., 300 tons of bars and 900 tons of welded bar trusses, Rip Van Winkle bridge; Frederick Snare Corpn., New York, low bidder on general contract.

Wilkes-Barre, Pa., 100 tons, Y. M. C. A. building.

Cleveland, 1400 tons, Parma reservoir for water works department; bids to be taken June 9.

Prairie du Sac, Wis., 240 tons, dam for Wisconsin Power & Light Co.

Los Angeles, 170 tons, planetarium at Griffith Park; William Simpson Construction Co., general contractor.

Los Angeles, 625 tons, Eaton Wash Dam; bids June 26, steel will be purchased separately.

State of California, 103 tons, paving in Tulare and Los Angeles counties; bids under advisement.

Sonoma, Cal., 100 tons, reservoir; bids under advisement.

Panama Canal Zone, 150 tons, general work; bids under advisement.

Pig Iron Strong in Cincinnati District

CINCINNATI, June 6.—The district market continues to acquire strength each week. Pig iron demand, the past week, rebounded from the low ebb of last week to a level equal to the average weekly tonnage in May. Furnace representatives reported sales totaling about 1000 tons, of which 200 tons, in small lots, was Southern iron. An east central Ohio melter took 500 tons of Northern foundry iron at the scheduled quotation. Furnaces are adhering strictly to new price structures without granting concessions on silicon differentials. In fact, talk of further price advances is current, since furnaces refuse to protect melters in the absence of specific tonnage orders. Shipments against old contracts increased the past week, bringing the movement of iron to the highest level that has prevailed this year. Foundry operations have improved.

Coke

Retail prices on domestic coke advanced 50c. June 1, dealers refusing to absorb recent mine advances which went into effect last month. Foundry coke shipments reflect increased foundry activity, but new business is featureless.

Steel

While the holiday caused a small recession in sheet bookings, particularly from automotive manufacturers, demand was sufficient to warrant rolling schedules in the neighborhood of 50 per cent of capacity output this week. Automotive specifications, however, on a daily average basis, were equal to last week and show no tendency to shrink. While no announcement of third quarter sheet prices has been made, a further advance is virtually certain.

Scrap

Most dealers are holding yard supplies in anticipation of price advances within the next few weeks. Some activity in sheet clippings, the past week, brought a firming in quotations on this item, but otherwise prices are unchanged. Current dealings are chiefly for immediate needs and, despite low inventories, mills are not eager to make scrap commitments.

Port Henry Furnaces, Mines Sold at Auction

Blast furnaces, real estate and mine properties of Witherbee, Sherman & Co., Port Henry, N. Y., with a value reported at $20,000,000, were sold at public auction on May 27 to the company's reorganization and bondholders' protective committees, which submitted jointly the sole bid. The sales price was $530,000. The indebtedness mentioned in the foreclosure was $3,880,290. Plans for reorganizing the company, which is in receivership, are expected to be completed by July 1.

Advances in Scrap Prices at Detroit

DETROIT, June 6.—A brisk demand for scrap by consumers at Youngstown and Pittsburgh has had the effect of pushing dealers' buying prices up 25c. to 50c. a ton for many items. Hydraulic compressed sheets have advanced 25c. and sheet clips and busheling 50c. Heavy melting steel is firm but unchanged at $7.25 to $7.75. Dealers are anticipating a further rise in prices in the near future.

Non-Ferrous Metals Move Higher on Sustained Demand

Tin Rises Sharply to 42.12½c. a Lb.; Copper Firm at 8c.— Lead Advances $4 a Ton; Zinc up $2 a Ton

NEW YORK, June 6.—Electrolytic copper prices scored further advances in the past seven-day period. Bolstered by an active consumer demand, the red metal sold on May 31 at 7.75c. a lb., Connecticut, and a secondary advance on June 1 brought it to 8c., delivered, at which level it has remained firm. Buying toward the close of the period slackened somewhat, but the price position has remained steady as a result of strong security markets and rising values in other commodities. Fabricators of copper and brass products increased their quotations yesterday ¼c. a lb. to a parity with 8c. for electrolytic. Ultimate consumption of copper continues to expand, and demand for electrolytic is consequently expected to assume renewed vigor within the near future. With the recent uptrend in consumption and prices, curtailment talk has momentarily ceased. Moreover, further moves for stabilizing the industry hinge largely upon legislation, and no action is expected until the Senate acts upon the industrial recovery bill. Copper production in 1932 in North and South America, according to the American Bureau of Metal Statistics, fell off sharply to 653,950 tons from 1,136,599 tons in 1931. Stocks, however, showed a slight increase, having totaled 572,791 at the close of 1932, compared with 544,278 tons at the end of 1931.

Although trading abroad was retarded by the Whitsuntide holiday, foreign price gains virtually matched those in the domestic market. Moderate tonnages were sold on the rise, which brought Continental values to 7.92½c. to 8c., c.i.f. usual European ports.

Copper Averages

The average price of Lake copper for May, based on daily quotations in THE IRON AGE, was 6.93c. a lb., delivered New York. The average price of electrolytic copper for that month was 6.68c., refinery, or 6.93c., delivered Connecticut.

Lead

Sustained consumer demand, higher prices abroad and favorable developments generally resulted in an advance on May 31 of $4 a ton, bringing the contracting basis up to 3.95c. a lb., St. Louis, and 4.10c., New York. Since the advance there has been a steady flow of buying for June and July shipment. The well diversified character of inquiry reflects a spreading improvement in leading consuming quarters. Interest in August requirements is already stirring, but leading smelters are restricting sales through July.

Zinc

The price situation in this market is still somewhat muddled. Early last week, prime Western was bid $2 to $2.50 a ton higher, but few sellers were inclined to accept much tonnage. While prices are not yet clearly definable, transactions during the week have established quotations at a range of 4.30c. to 4.35c. a lb., East St. Louis, or 4.67c. to 4.72c., New York. Consumer demand is not so insistent as it was a week ago, but there is still a good deal of interest in evidence. Sales of zinc in the past week totaled about 4000 tons. Joplin ore prices on Saturday were $1 higher at $30 a ton. Ore sales for the week, amounting to 6200 tons, were the largest reported for any week since April 22.

Tin

Another week of vigorous buying by consumers provided impetus for a further substantial advance in prices. Spot Straits at New York surged upward 2⅞c. a lb. during the week to today's level at 42.12½c. English refined tin and 99 per cent metal also experienced brisk demand, with particular preference manifested for the former grade because of its lower cost. Buying at present shows no indications of slackening. The sustained rate of tin plate operations, as well as unabated activity in the automobile industry, foreshadow an uninterrupted need for tin at least for the immediate future. Sales during the week covered delivery through August. Premiums for forward shipment are posted at about 10 points to ⅛c. a lb. per month. Trading in London has also been brisk. Values in that market advanced about £12 for the week, based on today's quotations of £215 7s. 6d. a ton for spot standard, £215 2s. 6d. for future standard, and £232 17s. 6d. for spot Straits. The Singapore price today, at £226 10s., reflected a rise of almost £10 for the week. Disappointing tin statistics for May failed to depress market sentiment. A decrease of 658 tons in the world's visible supply at the end of May fell far short of expectations. Deliveries of tin to American consumers aggregated 4835 tons.

The Week's Prices. Cents Per Pound for Early Delivery

	May 31	June 1	June 2	June 3	June 5	June 6
Electrolytic copper, N. Y.*	7.50	7.75	7.75	7.75	7.75	7.75
Lake copper, New York	7.75	8.00	8.00	8.00	8.00	8.00
Straits tin, Spot, N. Y.	40.75	40.65	41.10	....	41.12½	42.12½
Zinc, East St. Louis	4.30	4.30	4.30	4.30	4.30	4.30
Zinc, New York	4.67	4.67	4.67	4.67	4.67	4.67
Lead, St. Louis	3.95	3.95	3.95	3.95	3.95	3.95
Lead, New York	4.10	4.10	4.10	4.10	4.10	4.10

*Refinery quotations; price ¼c. higher delivered in Connecticut.

Aluminum, 98 to 99 per cent pure, 22.90c. a lb., delivered.
Nickel electrolytic cathode, 35c. a lb., delivered; shot and ingot, 36c. a lb., delivered.
Antimony, 6.35c. a lb., New York.
Brass ingots, 85-5-5-5, 8c. a lb., New York and Philadelphia.

From New York Warehouse

Delivered Prices, Base per Lb.

Tin, Straits pig	43.00c. to 44.00c.
Tin, bar	45.00c. to 46.00c.
Copper, Lake	9.00c. to 9.75c.
Copper, electrolytic	8.75c. to 9.25c.
Copper, castings	8.50c. to 9.50c.
*Copper sheets, hot-rolled	15.62½c.
*High brass sheets	13.25c.
*Seamless brass tubes	14.87½c.
*Seamless copper tubes	15.12½c.
*Brass rods	10.75c.
Zinc, slabs	5.50c. to 6.00c.
Zinc sheets (No. 9), casks	9.25c. to 9.50c.
Lead, American pig	4.75c. to 5.75c.
Lead, bar	6.25c. to 7.25c.
Lead, sheets	7.75c.
Antimony, Asiatic	8.00c. to 9.00c.
Alum., virgin, 99 per cent plus	23.30c.
Alum. No. 1 for remelting, 98 to 99 per cent	17.00c. to 18.00c.
Solder, ½ and ½	27.50c. to 28.50c.
Babbitt metal commercial grade	21.00c. to 45.00c.

*These prices are also for delivery from Chicago and Cleveland warehouses.

From Cleveland Warehouse

Delivered Prices per Lb.

Tin, Straits pig	45.12½c.
Tin, bar	47.12½c.
Copper, Lake	9.12½c.
Copper, electrolytic	9.12½c.
Copper, casting	8.50c.
Zinc, slab	5.25c. to 5.75c.
Lead, American pig	5.00c. to 5.25c.
Lead, bar	8.50c.
Antimony, Asiatic	8.50c.
Babbitt metal, medium grade	18.50c.
Babbitt metal, high grade	49.12½c.
Solder, ½ and ½	26.50c.

Old Metals, Per Lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators, and selling prices are those charged to consumers after the metal has been prepared for their uses. (All prices are nominal.)

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.25c.	6.75c.
Copper, hvy. and wire	6.12½c.	6.75c.
Copper, light and bottoms	4.75c.	5.62½c.
Brass, heavy	3.12½c.	3.87½c.
Brass, light	2.50c.	3.00c.
Hvy. machine composition	4.50c.	5.125c.
No. 1 yel. brass turnings	3.75c.	4.375c.
No. 1 red brass or compos. turnings	4.00c.	4.75c.
Lead, heavy	3.25c.	3.625c.
Zinc	2.25c.	2.625c.
Cast aluminum	6.00c.	7.00c.
Sheet aluminum	11.25c.	12.75c.

Prices of Finished and Semi-Finished Steel, Coke, Coal, Cast Iron Pipe

BARS, PLATES, SHAPES

Iron and Steel Bars

Soft Steel

Base per Lb.

F.o.b. Pittsburgh mill ..... 1.60c.
F.o.b. Chicago ..... 1.70c.
Del'd Philadelphia ..... 1.91c.
Del'd New York ..... 1.95c.
Del'd Detroit ..... 1.80c.
F.o.b. Cleveland ..... 1.65c.
F.o.b. Lackawanna ..... 1.70c.
F.o.b. Birmingham ..... 1.75c.
C.i.f. Pacific ports ..... 2.10c.

Billet Steel Reinforcing
(Cut lengths as quoted by distributers)

F.o.b. P'gh mills ..... 1.75c.
F.o.b. Birmingham ..... 1.75c.
F.o.b. Cleveland ..... 1.75c. to 1.90c.
F.o.b. Chicago ..... 1.75c. to 1.90c.

Rail Steel

F.o.b. mills, east of Chicago dist.... 1.50c.
F.o.b. Chicago Heights mills ..... 1.50c. to 1.65c.

Iron

Common iron, ... Chicago..... 1.60c.
Refined iron, f.o.b. P'gh mills ..... 2.75c.
Common iron, del'd Philadelphia ... 1.88c.
Common iron, del'd New York ..... 1.90c.

Tank Plates

Base per Lb.

F.o.b. Pittsburgh mill.....1.50c. to 1.60c.
F.o.b. Chicago ..... 1.70c.
F.o.b. Birmingham ..... 1.75c.
Del'd Cleveland ..... 1.8035c.
Del'd Philadelphia ....1.4935c. to 1.5935c.
F.o.b. Coatesville .....1.40c. to 1.50c.
F.o.b. Sparrows Point .....1.40c. to 1.50c.
Del'd New York .....1.598c. to 1.698c.
C.l.f. Pacific ports ..... 2.00c.
Wrought iron plates, f.o.b. P'gh ....3.00c.

Structural Shapes

Base per Lb.

F.o.b. Pittsburgh mill ..... 1.60c.
F.o.b. Chicago ..... 1.70c.
F.o.b. Birmingham ..... 1.75c.
F.o.b. Lackawanna ..... 1.70c.
F.o.b. Bethlehem ..... 1.70c.
Del'd Cleveland ..... 1.8035c.
Del'd Philadelphia ..... 1.7495c.
Del'd New York 1.86775c
C.l.f. Pacific ports (standard) 2.10c
C.l.f. Pacific ports (wide flange) ... 2.20c.

Steel Sheet Piling

Base per Lb.

F.o.b. Pittsburgh ..... 1.90c.
F.o.b. Chicago mill ..... 2.05c.
F.o.b. Buffalo ..... 2.00c.

Alloy Steel Bars

(F.o.b. Pittsburgh, Chicago, Buffalo, Massillon or Canton.)

Alloy Quantity Bar Base, 2.45c. to 2.65c. per Lb.

S.A.E. Series Numbers	Alloy Differential per 100 Lb.
2000 (1½% Nickel)	$0.25
2100 (1½% Nickel)	0.55
2320 (3½% Nickel)	1.50
2500 (5% Nickel)	2.25
3100 Nickel Chromium	0.55
3200 Nickel Chromium	1.35
3300 Nickel Chromium	2.80
3400 Nickel Chromium	3.25
4100 Chromium Molybdenum (0.16 to 0.25 Molybdenum)	0.50
4130 Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600 Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.50 to 2.00 Nickel)	1.05
5100 Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100 Chromium Steel (0.80 to 1.10 Chromium)	0.45
6100 Chromium Spring Steel	0.20
6100 Chromium Vanadium Bar	1.20
6100 Chromium Vanadium Spring Steel	0.95
9250 Silicon Manganese Spring Steel (flats)	0.25
Rounds and Square	0.50
Chromium Nickel Vanadium	1.50
Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finish alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis. Billets under 4 x 4 in. carry the steel bar base. Slabs with a section area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Cold Finished Bars*

Bars, f.o.b. Pittsburgh Mill ..... 1.70c.
Bars, f.o.b. Chicago ..... 1.75c.
Bars, Cleveland ..... 1.75c.
Bars, Buffalo ..... 1.75c.
Bars, Detroit ..... 1.90c.
Bars, eastern Michigan ..... 1.90c.
Shafting, ground, f.o.b. mill,
1½ in. 2.00c.
1-3/16 to 1¼ in. 2.50c.
1-9/16 to 1⅞ in. 2.35c.
1-15/16 to 2⅛ in. 2.20c.
2-15/16 to 6 in. 2.05c.

* In quantities of 10,000 to 19,999 lb.

SHEETS, STRIP, TIN PLATE TERNE PLATE

Sheets

Hot-Rolled

No. 10, f.o.b. Pittsburgh..1.50c. to 1.65c.
No. 10, f.o.b. Chi'o mill..1.60c. to 1.75c.
No. 10, del'd Philadelphia.1.81c. to 1.96c.
No. 10, f.o.b. Birming'm..1.65c. to 1.80c.
No. 10, c.i.f. Pacific Coast Ports..2.12½c.

Hot-Rolled Annealed

No. 24, f.o.b. Pittsburgh...2.10c. to 2.25c.
No. 24, f.o.b. Chi'o mills..2.20c. to 2.35c.
No. 24, del'd Philadelphia .2.41c. to 2.56c.
No. 24, f.o.b. Birming'm ..2.25c. to 2.40c.
No. 24, c.l.f. Pacific Coast ports...2.75c.
No. 24, wrought iron, Pittsburgh ...4.30c.

Heavy Cold-Rolled (Mill Run)

No. 10 gage, f.o.b. Pitts'h .....1.95c.
No. 10 gage, f.o.b. Chicago mills ..2.05c.
No. 10 gage, del'd Phila. .....2.26c.
No. 10 gage, del'd Pacific Coast ports 2.70c.

Light Cold-Rolled (Mill Run)

No. 20 gage, f.o.b. Pitts'h .....2.40c.
No. 20 gage, f.o.b. Chicago mills ..2.50c.
No. 20 gage, del'd Phila. .....2.71c.
No. 20 gage, del'd Pacific Coast ports, 2.95c.
Nos. 22 and 12.66 56

Auto Body and Steel Furniture

No. 10, f.o.b. Pittsburgh .....2.15c.
No. 20, f.o.b. Pittsburgh .....2.60c.
No. 20, f.o.b. Chicago .....2.70c.

Galvanized Sheets

No. 24, f.o.b. Pittsburgh ..2.70c. to 2.85c.
No. 24, f.o.b. Chicago mills .....2.95c.
No. 24, del'd Philadelphia .....3.16c.
No. 24, f.o.b. Birmingham .....2.85c.
No. 24, c.l.f. Pacific Coast ports...3.35c
No. 24, wrought iron, Pittsburgh....4.95.

Long Terne

No. 24, unassorted, 8-lb. coating f.o.b. Pittsburgh..2.75c. to 2.90c.

Vitreous Enameling Stock

No. 20, f.o.b. Pittsburgh.....2.90c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh .....2.30c.
No. 28, Chicago mill .....2.40c.

Tin Plate

Base per Box

Standard cokes, f.o.b. P'gh district mill $4.25
Standard cokes, f.o.b. Gary 4.35

Terne Plate

(*F.o.b. Morgantown or Pittsburgh*)
(Per Package, 20 x 28 in.)

8-lb. coating I.C. $8.70
15-lb. coating I.C. 11.00
20-lb. coating I.C. 11.90
25-lb. coating I.C. 13.00
30-lb. coating I.C. 13.80
40-lb. coating I.C. 15.30

Hot-Rolled Hoops, Bands, Strips and Flats under ¼ In.

Base per Lb.

All widths up to 24 in., Pittsburgh 1.55c. to 1.60c.
All widths up to 24 in., Chicago 1.65c. to 1.70c.
Cooperage stock, P'gh .....155c. to 1.60c.
Cooperage stock, Chicago ..1.65c. to 1.70c.

Cold-Rolled Strips

F.o.b. Pittsburgh .....2.00c.
F.o.b. Cleveland .....1.80c. to 2.00c.
Del'd Chicago .....2.30c.
F.o.b. Worcester .....2.15c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland .....2.60c.

WIRE PRODUCTS

(Carload lots, f.o.b. Pittsburgh and Cleveland.)
Extras of 10c. a 100 lb. on mixed and joint carloads, 20c. on pool carloads and 30c. on less than carloads are applied on all merchant wire products. In carloads and mixed carloads a discount of 10 per cent on extras is allowed.

To Manufacturing Trade

Bright wire .....2.10c.
Spring wire .....2.10c.

To Jobbing Trade

Base per Keg

Standard wire nails $1.85
Smooth coated nails 1.85
Galvanized nails 2.35

Base per 100 Lb.

Smooth annealed wire $2.25
Smooth galvanized wire 2.60
Polished staples 2.55
Galvanized staples 2.80
Barbed wire, galvanized 2.35
Woven wire fence No. 9 gage, base column, per net ton $50.00

Chicago and Anderson, Ind., mill prices are $1 a ton over Pittsburgh base; Duluth, Minn. and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

STEEL AND WROUGHT PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio Mills

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Wrought Iron Inches	Wrought Iron Black	Wrought Iron Galv.
⅛	55	33	⅛	+91½	+138
¼ to ⅜	60½	42	¼ & ⅜	+1½	+21½
½	65¾	54	½	31½	15
¾	69	59	¾	36½	20½
1 to 3	71	61	1 to 1¼	39½	25½
			1½	43½	28
			2	41½	26

Lap Weld

2	66	57	2	37	22½
2½ to 6	69½	60½	2½ to 3½	38	25
7 and 8	68	58	4 to 8	40	28½
9 and 10	67	57	9 to 12	38	24½
11 and 12.66		56			

Butt Weld, extra strong, plain ends

⅛	52	37	⅛	+12	+45½
¼ to ⅜	58	45	¼ & ⅜	+2½	+34½
½	63½	54½	½	32½	17½
¾	68	59	¾	37½	22½
1 to 3	70	62	1 to 2	43½	29

Lap Weld, extra strong, plain ends

2	65	57	2	40	26
2½ to 6	69	61	2½ to 4.45	43½	33
7 to 8	68	58	4½ to 6.45		32½
9 and 10	67	57	7 & 8	46	33
11 and 12.	66	56	9 to 12	41½	30

Discounts on steel and wrought iron pipe are net and not subject to any points or preferentials.

Note—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel	Charcoal Iron
2 in. and 2¼ in. 38	1½ in. 1
2½ in.—2¾ in. 46	1¾ in. 8
3 in. 52	2 in.—2¼ in.. 13
3¼ in.—4¾ in. 54	2½ in.—2¾ in. 16
4 in. 57	3 in. 17
4½ in. to 6 in. 46	3¼ in. to 3½ in. 18
	4 in. 20
	4½ in. 21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold-Drawn

1 in.	51	3 in.	46
1¼ to 1½ in...	53	3¼ to 3½ in. .	48
1¾ in.	37	4 in.	51
2 to 2¼ in. ...	32	4½, 5 and 6 in.	40
2½ to 2¾ in. .	40		

Hot Rolled

2 and 2¼ in. ..	38	3¼ to 3½ in. .	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb. base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. in lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

Per Cent Off List

Carbon, 0.10% to 0.30% base (carloads) 55
Carbon, 0.30% to 40% base 50
Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

RAILS AND TRACK SUPPLIES

Rails

Per Gross Ton

Standard, f.o.b. mill $40.00
Light (from billets), f.o.b. mill ... 30.00
Light (from rail steel, f.o.b. mill) .. 26.00

Track Equipment

Base per 100 Lb.

Spikes, 9/16 in. and larger $2.15
Spikes, ⅜-in. and larger 2.30
Spikes, boat and barge 2.60
Tie plates, steel 1.75
Angle bars 2.55
Track bolts, to steam railroads 3.50
Track bolts, to jobbers, all sizes, (per 100 count) .....75 per cent off list

BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine bolts 73
Carriage bolts 73
Lag bolts 73
Plow bolts, Nos. 1, 2, 3 and 7 heads. 73
Hot-pressed nuts, blank or tapped, square 73
Hot-pressed nuts, blank or tapped, hexagons 73
C.p.c. and t. square or hex nuts, blank or tapped 73
Semi-finished hexagon nuts 73
Semi-finished hexagon castellated nuts, S.A.E. 73
Stove bolts in packages, P'gh, 72½, 25 and 10
Stove bolts in packages, Ch'go, 72½, 25 and 10
Stove bolts in pkgs., Cleveland, 72½, 25 and 10
Stove bolts in bulk, P'gh. 85
Stove bolts in bulk, Chicago..... 85
Stove bolts in bulk, Cleveland..... 85
Tire bolts .....60 and 10

Discounts of 75 per cent off on bolts and nuts applied on carload business with jobbers and large consumers.

Large Rivets

(½-in. and larger)

Base per Lb.

F.o.b. Pittsburgh or Cleveland.....$2.25
F.o.b. Chicago 2.35

Small Rivets

(7/16-in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh .....70, 10 and 10
F.o.b. Cleveland .....70, 10 and 10
F.o.b. Chicago .....70, 10 and 10

Cap and Set Screws

(Freight allowed up to but not exceeding 65c. per 100 lb. on lots of 200 lb. or more)

Per Cent Off List

Milled cap screws, 1 in. dia. and smaller 85
Milled standard set screws, case hardened, 1 in. dia. and smaller 80
Milled headless set screws, cut thread ¾ in. and smaller .....75 and 10
Upset hex. head cap screws, U.S.S. or S.A.E. thread, 1 in. dia. and smaller .....85 and 10
Upset set screws, sq. head..... 80
Milled studs 70

SEMI-FINISHED STEEL

Billets and Blooms

Per Gross Ton

Rerolling, 4-in. to 6-in., inclusive Pittsburgh $26.00
Rerolling, 4-in. to 6-in., inclusive Youngstown 26.00
Rerolling, 4-in. to 6-in., inclusive Cleveland 26.00
Rerolling, 4-in. to 6-in., inclusive Chicago 26.00
Forging quality, Pittsburgh 31.00
Forging quality, Youngstown 31.00

Sheet Bars

(Open-Hearth or Bessemer)

Per Gross Ton

Pittsburgh $26.00
Youngstown 26.00
Cleveland 26.00

Slabs

(3 in. x 2 in. and under 10 in. x 10 in.)

Per Gross Ton

Pittsburgh $26.00
Youngstown 26.00
Cleveland 26.00

(Turn to next page)

Skelp

(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.60c.
Universal	1.60c.
Sheared	1.60c.

Wire Rods

(Common soft, base)

	Per Gross Ton
Pittsburgh	$35.00
Cleveland	35.00
Chicago	36.00

COKE, COAL AND FUEL OIL

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville Prompt	$1.75 to $2.00
Foundry, f.o.b. Connellsville Prompt	2.50 to 4.00
Foundry, by-product, Chicago ovens, for delivery outside switching districts	7.00
Foundry, by-product, delivered in Chicago switching district	7.75
Foundry, by-product, New England, delivered	10.00
Foundry, by-product, Newark or Jersey City, del'd	8.20 to 8.81
Foundry, by-product, Phila.	8.50
Foundry, by-product, Cleveland, delivered	7.82
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.10 to $1.20
Mine run coking coal f.o.b. W. Pa.	1.20 to 1.40
Gas coal, ¾-in., f.o.b. Pa. mines	1.30 to 1.40
Mine run gas coal, f.o.b. Pa. mines	1.30 to 1.40
Steam slack, f.o.b. W. Pa. mines	0.45 to 0.55
Gas slack, f.o.b. W. Pa. mines	0.65 to 0.75

Fuel Oil

	Per Gal. f.o.b. Bayonne, N. J.
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

	Per Gal. f.o.b. Baltimore
No. 3 distillate	4.00c.
No. 4 industrial	3.50c.

	Per Gal. del'd Chicago
No. 3 industrial fuel oil	3.25c.
No. 5 industrial fuel oil	2.65c. to 2.75c.

	Per Gal. f.o.b. Cleveland
No. 3 distillate	5.00c.
No. 4 industrial	4.50c.

REFRACTORIES

Fire Clay Brick

	Per 1000 f.o.b. Works: High-heat Duty Brick	Intermediate Duty Brick
Pennsylvania	$40.00	$35.00
Maryland	40.00	35.00
New Jersey	50.00	38.00
Ohio	40.00	35.00
Kentucky	40.00	35.00
Missouri	40.00	35.00
Illinois	40.00	35.00
Ground fire clay, per ton	7.00	

Chrome Brick

	Per Net Ton
Standard size	$42.50 to $45.00

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$40.00
Chicago	40.00
Birmingham	50.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, burned, f.o.b. Baltimore and Chester, Pa.	$65.00
Unburned, f.o.b. Baltimore	52.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00
Domestic, f.o.b. Chewelah, Wash.	22.00

CAST IRON PIPE

	Per Net Ton
6-in. and larger, del'd Chicago	$41.40
4-in., del'd Chicago	44.40
6-in., and larger, del'd New York	38.30
4-in., del'd New York	41.30
6-in. and larger, Birmingham,	$35.00 to 36.00
4-in., Birmingham	38.00 to 39.00

Class "A" and gas pipe, $3 extra.

Pig Iron, Ores, Ferroalloys

VALLEY

Per Gross ton f.o.b. Valley furnace:

Basic	$15.00
Bessemer	16.00
Gray forge	15.50
No. 2 foundry	15.50
No. 3 foundry	15.00
Malleable	15.50
Low phos., copper free	23.00

Freight rate to Pittsburgh or Cleveland district, $1.88.

PITTSBURGH

Per gross ton, f.o.b. Pittsburgh district furnace:

Basic	$15.50
No. 2 foundry	16.00
No. 3 foundry	15.50
Malleable	16.00
Bessemer	16.50

Freight rates to points in Pittsburgh district range from 69c. to $1.26.

CHICAGO

Per gross ton at Chicago furnaces:

N'th'n No. 2 fdy.	$16.00
N'th'n No. 1 fdy.	16.50
Malleable, not over 2.25 sil.	16.00
High phosphorus	16.00
Lake Super. charcoal, sil. 1.50, by rail	23.17
Southern No. 2 fdy.	$16.14 to 17.14
Low. phos., sil. 1 to 2, Copper free.	25.00
Silvery, sil. 8 per cent.	24.92
Bess. ferrosil'n, 15 per cent.	28.92

Prices are delivered consumers' yards except on Northern foundry, high phosphorous and malleable, which are f.o.b. local furnaces, not including a switching charge.

ST. LOUIS

Per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$16.00
Del'd St. Louis	16.85
Malleable, f.o.b. Granite City	16.50
Northern No. 2 fdy., del'd St. Louis	18.30
Northern malleable, del'd	18.30
Northern basic, del'd	18.30
Southern fdy., sil. 1.75 to 2.25 del'd St. Louis	16.35

Freight rates, 83c (average) Granite City to St. Louis; $2.30 from Chicago; $4.56 from Birmingham.

NEW YORK

Per Gross ton, delivered New York district:

*Buffalo, No. 2, del'd Eastern N. J.	$17.41
Buffalo malleable, del'v'd Eastern N. J.	17.91
East Pa. No. 2 fdy.	17.09
East Pa. No. 2X fdy.	17.52

Freight rates: $1.52 to $2.63 from eastern Pennsylvania.

*Prices delivered to New Jersey cities using rate of $3.41 a ton from Buffalo.

BUFFALO

Per gross ton, f.o.b. furnace:

No. 2 fdy.	$16.00
No. 2X fdy.	16.50
No. 1 fdy.	17.50
Malleable, sil. up to 2.25	16.50
Basic	14.00
Lake Superior charcoal, del'd.	23.41

CINCINNATI

Per gross ton, delivered Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	$16.51
Ala. fdy., sil. 2.25 to 2.75	16.76
Tenn. fdy., sil. 1.75 to 2.25	16.51
N'th'n No. 2 foundry	$17.01 to 18.19
S'th'n Ohio silvery, 8%	21.39

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.82 from Birmingham.

CLEVELAND

Per gross ton at Cleveland furnace:

N'th'n No. 2 fdy.	$15.50
Malleable	15.50
Ohio silvery, 8 per cent.	23.00
Stand. low. phos., Valley	22.00
Southern No. 2 fdy.	16.14

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates; 63c. average local switching charge; $3.00 from Jackson, Ohio; $6.14 from Birmingham.

PHILADELPHIA

Per gross ton at Philadelphia:

East. Pa. No. 2	$16.34
East. Pa. No. 2X	16.84
East. Pa. No. 1X	17.34
Basic (del'd east Pa.)	16.09
Malleable	16.84
Stand low phos. (f.o.b. east. Pa. furnace)	$22.00 to $23.00
Cop. b'r'g low phos. (f.o.b. furnace)	22.00 to 23.00
Va. No. 2	21.79
Va. No. 2X	22.29

Prices, except as specified otherwise, are delv'd Philadelphia. Freight rates: 84c. to $1.79 from eastern Pennsylvania furnaces; $1.67 from Virginia furnaces.

BIRMINGHAM

Per gross ton, f.o.b. Birmingham dist. furnace:

No. 2 fdy., 1.75 to 2.25 sil.	$12.00
No. 2 soft, 2.25 to 2.75 sil.	12.50
Basic	12.00

NEW ENGLAND

Per gross ton delivered Boston and nearby New England points:

Buffalo, sil. 1.75 to 2.25	$18.53 to $19.04
Buffalo, sil. 2.25 to 2.75	18.53 to 19.04
Ala., sil. 1.75 to 2.25	18.00 to 18.50

CANADA

Per gross ton:

Delivered Toronto	
No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.75	22.10
Malleable	22.60
Delivered Montreal	
No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	$23.00 to 23.50

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	$68.00 to $72.00
Foreign, 80%, Atlantic or Gulf port, duty paid	68.00

The lower price applies to contracts for delivery to June 30, for spot shipment the price is $72.

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$24.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50% (carloads)	$74.50
50% (less carloads)	82.00
75% (carloads)	120.00
75% (less carloads)	130.00
14% to 16% (f.o.b.) Welland, Ont. (in carloads)	31.00
14% to 16% (less carloads)	36.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
10%	$21.50	14%	$23.50
11%	22.00	15%	24.00
12%	22.50	16%	24.50
13%	23.00		

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		Per Gross Ton	
6%	$19.00	12%	$22.00
7%	19.50	13%	22.50
8%	20.00	14%	23.00
9%	20.50	15%	23.50
10%	21.00	16%	24.00
11%	21.50		

Other Ferroalloys

Ferrotungsten, per lb. wo. del., carloads	94c.
Ferrotungsten, less carloads	$1.00
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr, delivered, in carloads	9.50c.
Ferrochromium, 2% carbon	16.50c. to 17.00c.
Ferrochromium, 1% carbon	17.50c. to 18.00c.
Ferrochromium, 0.10% carbon	19.50c. to 20.00c.
Ferrochromium, 0.06% carbon	20.00c. to 20.50c.
Ferrovanadium, del., per lb. contained Va.	$2.60 to $2.80
Ferrotitanium, 15 to 18%, per net ton, f.o.b. furnace in carloads	160.00
Ferrophosphorus, electric, or blast furnace material, in carloads, 18%, Rockdale, Tenn., base, per gross ton with $2 unitage	50.00
Ferrophosphorus, electric, 24% f.o.b. Anniston, Ala., per gross ton with $2.75 unitage	65.00
Ferromolybdenum, per lb. Mo., del.	95c.
Calcium molybdate, per lb. Mo., del.	90c.
Silico spiegel, per ton, f.o.b. furnace, car lots	$36.00
Ton lots or less, per ton	41.00
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	85.00
2% carbon grade	90.00
1% carbon grade	100.00
Spot prices	$5 a ton higher

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.5% iron	$4.85
Old range, non-Bessemer, 51.50% iron	4.60
Mesabi Bessemer, 51.50% iron	4.60
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorous, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron, low phos., copper free, 55 to 58% iron, dry Spanish or Algerian	7.50c.
Iron, low phos., Swedish, average 68½% iron	9c.
Iron, basic or foundry, Swedish, average, 65% iron	7.50c.
Iron, basic or foundry, Russian, aver. 63% iron (nom.)	7.50c.
Manganese, Caucasian, washed 52%	18c.
Manganese, African, Indian, 50-52%	18c.
Manganese, Brazilian, 46 to 48%	16c.

	Per Net Ton Unit
Tungsten, Chinese wolframite, duty paid	$10.00

	Per Gross Ton
Tungsten, domestic scheelite	$8.00 to $10.00
Chrome, 45%, Cr_2O_3, crude, c.i.f. Atlantic Seaboard	16.00
Chrome, 48%, Cr_2O_3, c.i.f. Atlantic seaboard	18.00

*Quotations nominal in absence of sales.

Fluorspar

	Per Net Ton
Domestic, washed gravel, 85-5 f.o.b. Kentucky and Illinois mines	$10.50 to $11.50
No. 2 lump, 85-5, f.o.b. Kentucky and Illinois mines	13.50
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	18.75
Domestic, No. 1 ground bulk, 85 to 98% calcium, fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	20.00

Iron and Steel Scrap

PITTSBURGH

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$11.25 to $12.25
No. 2 heavy melting steel	10.00 to 10.50
No. 2 railroad wrought	11.50 to 12.00
Scrap rails	11.50 to 12.00
Rails 3 ft. and under	12.50 to 13.00
Sheet bar crops, ordinary	12.00 to 12.50
Compressed sheet steel	11.50 to 12.00
Hand bundled sheet steel	10.00 to 10.50
Hvy. steel axle turnings	9.50 to 10.00
Machine shop turnings	8.75 to 9.25
Short shov. steel turnings	8.75 to 9.25
Short mixed borings and turnings	8.00 to 8.50
Cast iron borings	8.00 to 8.50
Cast iron carwheels	11.00 to 11.50
Heavy breakable cast	9.00 to 9.50
No. 1 cast	10.00 to 11.00
Railr. knuckles and couplers	13.00 to 14.00
Rail, coil and leaf springs	13.00 to 14.00
Rolled steel wheels	13.00 to 14.00
Low phos. billet crops	14.00 to 14.50
Low phos. sheet bar crops	13.50 to 14.00
Low phos. plate scrap	13.50 to 14.00
Low phos. punchings	13.50 to 14.00
Steel car axles	13.00 to 13.50

CHICAGO

Delivered Chicago district consumers:

	Per Gross Ton
Heavy melting steel	$8.50 to $9.00
Shoveling steel	8.50 to 9.00
Hydraulic comp. sheets	$7.00 to $7.50
Drop forge flashings	6.25 to 6.75
No. 1 busheling	7.00 to 7.50
Rolled carwheels	9.50 to 10.00
Railroad tires	9.50 to 10.00
Railroad leaf springs	9.50 to 10.00
Axle turnings	7.00 to 7.50
Steel couplers and knuckles	9.50 to 10.00
Coil springs	10.00 to 10.50
Axle turnings (elec. fur.)	7.50 to 8.00
Low phos. punchings	9.50 to 10.00
Low phos. plates, 12 in. and under	9.50 to 10.00
Cast iron borings	5.00 to 5.50
Short shoveling turnings	5.00 to 5.50
Machine shop turnings	5.50 to 6.00
Rerolling rails	9.50 to 10.00
Steel rails, less than 3 ft.	9.50 to 10.00
Steel rails, less than 2 ft.	10.00 to 10.50
Angle bars, steel	9.50 to 10.00
Cast iron carwheels	9.50 to 10.00
Railroad malleable	9.75 to 10.25
Agricultural malleable	7.50 to 8.00

	Per Net Ton
Iron car axles	$12.50 to $13.00
Steel car axles	10.50 to 11.00
No. 1 railroad wrought	7.00 to 7.50
No. 2 railroad wrought	7.50 to 8.00

No. 2 busheling	$4.00	to $4.50
Locomotive tires, smooth	7.50	to 8.50
Pipe and flues	1.25	to 1.75
No. 1 machinery cast	8.75	to 9.25
Clean automobile cast	8.75	to 9.25
No. 1 railroad cast	8.50	to 9.00
No. 1 agricultural cast	8.00	to 8.50
Stove plate	7.00	to 7.50
Grate bars	6.75	to 7.25
Brake shoes	8.00	to 8.50

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

PHILADELPHIA

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$9.00	to $9.50
No. 2 heavy melting steel	8.00	to 8.50
No. 1 railroad wrought	....	11.00
Bundled sheets	4.00	to 4.50
Hydraulic compressed, new	....	6.00
Hydraulic compressed, old	....	5.00
Machine shop turnings	5.00	to 5.50
Heavy axle turnings	7.50	to 8.00
Cast borings	3.50	to 3.75
Heavy breakable cast	....	9.50
Stove plate (steel works)	7.00	to 7.50
No. 1 low phos. heavy	11.00	to 11.50
Couplers and knuckles	10.00	to 10.50
Rolled steel wheels	10.00	to 10.50
No. 1 blast furnace	3.50	to 3.75
Spec. iron and steel pipe	....	8.00
Shafting	13.00	to 13.50
Steel Axles	13.00	to 13.50
No. 1 forge fire	8.00	to 8.50
Cast iron carwheels	10.00	to 10.50
No. 1 cast	10.00	to 10.50
Cast borings (chem.)	10.00	to 10.50
Steel rails for rolling	9.50	to 10.00

CLEVELAND

Per gross ton delivered consumers' yards:

No. 1 heavy melting steel	$9.00	to $9.50
No. 2 heavy melting steel	8.50	to 9.00
Compressed sheet steel	9.00	to 9.50
Light bundled sheet stampings	6.50	to 7.00
Drop forge flashings	8.00	to 8.50
Machine shop turnings	5.75	to 6.00
Short shoveling turnings	6.75	to 7.25
No. 1 busheling	7.50	to 8.00
Steel axle turnings	7.50	to 8.00
Low phos., billet crops	12.00	to 12.50
Cast iron borings	6.25	to 6.75
Mixed borings and short turnings	6.25	to 6.75
No. 2 busheling	6.25	to 6.50
No. 1 cast	10.00	to 10.50
Railroad grate bars	5.50	to 6.00
Stove plate	5.50	to 6.00
Rails under 3 ft.	8.50	to 9.00
Rails for rolling	10.00	to 10.50
Railroad malleable	10.00	to 10.50
Cast iron carwheels	....	11.00

BUFFALO

Per gross ton, f.o.b. Buffalo consumers' plants:

No. 1 heavy melting steel	$9.00	to $10.00
No. 2 heavy melting scrap	8.00	to 8.50
Scrap rails	7.00	to 7.50
New hydraul. comp. sheets	8.00	to 8.50
Old hydraul. comp. sheets	7.00	to 7.50
Drop forge flashings	7.50	to 8.00
No. 1 busheling	8.00	to 8.50
Hvy. steel axle turnings	6.50	to 7.00
Machine shop turnings	....	5.00
Knuckles and couplers	9.00	to 9.50
Coil and leaf springs	9.00	to 9.50
Rolled steel wheels	9.00	to 9.50
Low phos. billet crops	12.00	to 12.50
Short shov. steel turnings	6.50	to 7.00
Short mixed borings and turnings	4.50	to 5.00
Cast iron borings	3.75	to 4.25
No. 2 busheling	3.50	to 4.00
Steel car axles	10.00	to 11.00
Iron axles	10.00	to 11.00
No. 1 machinery cast	10.50	to 11.00
No. 1 cupola cast	9.00	to 9.50
Stove plate	7.50	to 8.00
Steel rails, 3 ft. and under	11.50	to 12.00
Cast iron carwheels	8.00	to 9.00
Industrial malleable	7.00	to 7.50
Railroad malleable	9.50	to 10.50
Chemical borings	7.50	to 8.00

BIRMINGHAM

Per gross ton delivered consumers' yards:

Heavy melting steel		$9.00
Scrap steel rails	$7.50	to 8.00
Short shoveling turnings	....	4.00
Stove plate	6.50	to 7.00
Steel axles	10.00	to 11.00
Iron axles	10.50	to 11.00
No. 1 railroad wrought	....	5.00
Rails for rolling	8.50	to 9.00
No. 1 cast	8.50	to 9.00
Tramcar wheels	8.50	to 9.00
Cast iron borings, chem.	....	5.00

ST. LOUIS

Per gross ton delivered consumers' yards:

Selected heavy steel	$8.00	to $8.50
No. 1 heavy melting	8.00	to 8.50
No. 2 heavy melting	7.50	to 8.00
No. 1 locomotive tires	6.00	to 6.50
Misc. stand.-sec. rails	8.50	to 9.00
Railroad Springs	9.00	to 9.50
Bundled sheets	3.50	to 4.00
No. 2 railroad wrought	8.00	to 8.50
No. 1 busheling	3.50	to 4.00
Cast iron borings and shoveling turnings	2.50	to 3.00
Rails for rolling	9.50	to 10.00
Machine shop turnings	2.50	to 3.00
Heavy turnings	4.00	to 4.50
Steel car axles	9.50	to 10.00
Iron car axles	11.00	to 11.50
Wrot. iron bars and trans.	7.00	to 7.50
No. 1 railroad wrought	5.50	to 6.00
Steel rails less than 3 ft.	10.00	to 10.50
Steel angle bars	9.00	to 9.50
Cast iron carwheels	8.00	to 8.50
No. 1 machinery cast	8.00	to 8.50
Railroad malleable	8.00	to 8.50
No. 1 railroad cast	8.00	to 8.50
Stove plate	7.00	to 7.50
Relay rails, 60 lb. and under	16.00	to 16.50
Relay. rails, 60 lb. and over	$20.00	to $21.00
Agricult. malleable	4.00	to 4.50

BOSTON

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$5.00	to $5.25
Scrap T rails	4.75	to 5.00
Machine shop turnings	2.00	to 2.25
Cast iron borings	2.00	to 2.25
Bundled skeleton, long	3.00	to 3.25
Forge flashings	3.00	to 3.25
Blast furnace scrap	1.75	to 2.00
Shafting	7.50	to 8.00
Steel car axles	8.00	to 8.50
Wrought pipe	2.25	to 2.50
Rails for rerolling	6.00	to 6.50
Cast iron borings, chemical	7.25	to 7.75

Per gross ton delivered consumers' yards:

Textile cast	$7.00	to $7.50
No. 1 machinery cast	7.00	to 7.50
Stove plate	4.25	to 4.50
Railroad malleable	8.50	to 9.50

NEW YORK

Dealers' buying prices per gross ton:

No. 1 heavy melting steel	$5.50	to $6.00
No. 2 heavy melting steel	4.50	to 5.00
Heavy melting steel (yard)	2.50	to 3.00
No. 1 heavy breakable cast	5.00	to 5.50
Stove plate (steel works)	3.25	to 3.50
Machine shop turnings	2.50	to 3.00
Short shoveling turnings	2.50	to 3.00
Cast borings	2.50	to 3.00
No. 1 blast furnace	2.50	to 3.00
Steel car axles	9.50	to 10.00
Spec. iron and steel pipe	$3.00	to $3.25
Forge fire	....	4.25
No. 1 railroad wrought	5.00	to 5.50
No. 1 yard wrought long	3.50	to 3.75
Rails for rolling	5.50	to 6.00
No. 1 cast	5.50	to 5.75
No. 2 cast	4.50	to 4.75
Stove plate (foundry)	4.50	to 5.00
Cast borings (chemical)	6.00	to 6.50

Per gross ton, delivered local foundries:

No. 1 machinery cast		$9.00
No. 1 hvy. cast (cupola size)	7.50	to 8.00
No. 2 cast	5.00	to 5.50

CINCINNATI

Dealers' buying prices per gross ton:

Heavy melting steel	$7.25	to $7.75
Scrap rails for melting	7.25	to 7.75
Loose sheet clippings	2.50	to 3.00
Bundled sheets	4.25	to 4.75
Cast iron borings	3.50	to 4.00
Machine shop turnings	3.25	to 3.75
No. 1 busheling	4.50	to 5.00
No. 2 busheling	2.75	to 3.25
Rails for rolling	7.75	to 8.25
No. 1 locomotive tires	7.25	to 7.75
Short rails	10.00	to 10.50
Cast iron carwheels	7.25	to 7.75
No. 1 machinery cast	6.75	to 7.25
No. 1 railroad cast	6.25	to 6.75
Burnt cast	4.50	to 5.00
Stove plate	4.50	to 5.00
Agricultural malleable	7.75	to 8.25
Railroad malleable	8.00	to 8.50

DETROIT

Dealers' buying prices per gross ton:

Hvy. melting steel	$7.25	to $7.75
Borings and short turnings	5.50	to 6.00
Long turnings	4.50	to 5.00
No. 1 machinery cast	8.00	to 8.50
Automotive cast	10.00	to 10.50
Hydraul. comp. sheets	7.50	to 8.00
Stove plate	4.50	to 5.00
New No. 1 busheling	6.50	to 7.00
Old No. 2 busheling	4.50	to 5.00
Sheet clippings	3.75	to 4.25
Flashings	5.25	to 5.75

CANADA

Dealers' buying prices per gross ton:

	Toronto	Montreal
Heavy melting steel	$4.50	$4.50
Rails, scrap	4.50	4.50
Machine shop turnings	2.00	2.00
Boiler plate	4.50	4.50
Heavy axle turnings	2.50	2.50
Cast borings	2.00	2.00
Steel borings	2.00	2.00
Wrought pipe	2.50	2.50
Steel axles	4.50	6.00
Axles, wrought iron	4.50	6.50
No. 1 machinery cast	7.75	9.00
Stove plate	4.50	5.00
Standard carwheels	7.25	7.00
Malleable	6.75	7.00

Warehouse Prices for Steel Products

PITTSBURGH

	Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.60c.
Reinforcing steel bars	2.60c.
Cold-finished and screw stock—	
Rounds and hexagons	2.95c.
Squares and flats	2.95c.
Hoops and bands, under ¼ in.	2.95c.
Hot-rolled annealed sheets (No. 24), 25 or more bundles	3.10c.
Galv. sheets (No. 24), 25 or more bundles	3.60c.
Hot-rolled sheets (No. 10)	2.60c. to 2.90c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	$3.61
Spikes, large	2.40c.
Small	2.65c.
Boat	2.90c.
Track bolts, all sizes, per 100 count, 70 per cent off list.	
Machine bolts, 100 count, 70 per cent off list.	
Carriage bolts, 100 count, 70 per cent off list.	
Nuts, all styles, 100 count, 70 per cent off list.	
Large rivets, base per 100 lb.	$3.00
Wire, black, soft ann'l'd, base per 100 lb.	2.65
Wire, galv. soft, base per 100 lb.	3.10
Common wire nails, per keg	2.20
Cement coated nails, per keg	2.20

On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applied to orders of 400 to 999 lb.

CHICAGO

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	2.75c.
Reinforc. bars, billet steel	1.55c. to 1.70c.
Rail steel reinforcement	1.30c. to 1.45c.
Cold-fin. steel bars and shafting	
Rounds and hexagons	3.00c.
Flats and squares	3.50c.
Bands, 5/16 in. (in Nos. 10 and 12 gages)	2.95c.
Hoops (No. 14 gage and lighter)	3.50c.
Hot-rolled annealed sheets (No. 24)	3.45c.
Galv. sheets (No. 24)	3.85c.
Hot-rolled sheets (No. 10)	2.75c.
Spikes (3/16 in. and lighter)	3.45c.
Track bolts	4.30c.
Rivets, structural (keg lots)	2.75c.
Rivets, boiler (keg lots)	2.75c.
	Per Cent Off List
Machine bolts	65
Carriage bolts	65
Coach and lag screws	65
Hot-pressed nuts, sq., tap. or blank.	65
Hot-pressed nuts, hex., tap. or blank.	65
Hex. head cap screws	80 and 10
Cup point set screws	75
Flat head bright wood screws	50 and 10
Spring cotters	60 and 10
Stove bolts	80
Rd. hd. tank rivets, 7/16 in. and smaller	65
Wrought washers	$4.50 off list
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	2.30
Cement c't'd nails, base per keg	2.30

NEW YORK

	Base per lb.
Plates and struc. shapes	3.10c.
Soft steel bars, small shapes	3.10c.
Iron bars	3.24c.
Iron bars, swed. charcoal	5.75c. to 6.25c.
Cold-fin. shafting and screw stock:	
Rounds and hexagons	3.54c.
Flats and squares	4.04c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.36c.
Bands	3.36c.
Hot-rolled sheets (No. 10)	2.60c.
Hot-rolled ann'l'd sheets (No. 24*)	3.25c.
Galvanized sheets (No. 24*)	3.50c.
Long terne sheets (No. 24)	4.50c.
Standard tool steel	12.00c.
Wire, black annealed (No. 10)	3.60c.
Wire, galv. annealed (No. 10)	4.05c.
Tire steel ⅝ x ¼ in. and larger	3.40c.
Smooth finish, 1 to 2¼ x ¼ in. and larger	3.75c.
Open hearth spring steel, bases 4.50c. to 7.00c.	
Common wire nails, base, per keg	$2.65
	Per Cent
Machine bolt, cut thread:	Off List
¾ x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread:	
⅝ x 6 in. and smaller	65 to 65 and 10
¾ x 20 in. and smaller	65 to 65 and 10
Boiler tubes:	Per 100 Ft.
Lap welded, 2-in.	$18.05
Seamless welded, 2-in.	19.24
Charcoal iron, 2-in.	24.94
Charcoal iron, 4-in.	63.65

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

ST. LOUIS

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
Cold-fin. rounds, shafting, screw stock	3.36c.
Hot-rolled annealed sheets (No. 24)	3.60c.
Galv. sheets (No. 24)	4.00c.
Hot-rolled sheets (No. 10)	3.00c.
Black corrug. sheets (No. 24)	3.65c.
Galv. corrug. sheets	4.05c.
Structural rivets	3.00c.
Boiler rivets	3.00c.
	Per Cent Off List
Tank rivets, 7/16 in. and smaller, 100 lb. or more	70
Less than 100 lb.	70
Machine bolts	65
Carriage bolts	65
Lag screws	65
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	65
Less than 200 lb.	55
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	65
Less than 200 lb.	55

PHILADELPHIA

	Base per Lb.
*Plates, ¼-in. and heavier	2.45c.
*Structural shapes	2.45c.
*Soft steel bars, small shapes, iron bars (except bands)	2.45c.
Reinforc. steel bars, sq., twisted and deform.	2.30c.
Cold-finished steel bars	3.35c.
*Steel hoops	3.00c.
*Steel bands, No. 12 to 3/16 in., incl.	2.75c.
Spring steel	5.00c.
†Hot-rolled annealed sheets (No. 24)	3.15c.
†Galvanized sheets (No. 24)	3.50c.
*Hot-rolled annealed sheets (No. 10)	2.70c.
Diam. pat. floor plates, ¼ in.	5.00c.
Swedish iron bars	5.60c.

These prices are subject to quantity differentials except on reinforcing and Swedish iron bars.

*Base prices subject to deductions on orders aggregating 4000 lb. or over.

†For 50 bundles or over.

CLEVELAND

	Base per Lb.
Plates and struc. shapes	2.95c.
Soft steel bars	2.75c.
Reinforc. steel bars	1.75c. to 2.25c.
Cold-fin. steel bars	2.95c.
Flat rolled steel under ¼ in.	3.00c.
Cold-finished strip	5.55c.
Hot-rolled annealed sheets (No. 24)	3.25c.
Galvanized sheets (No. 24)	3.50c.
Hot-rolled sheets (No. 10)	3.00c.
Black ann'l'd wire, per 100 lb.	$2.55
No. 9 galv. wire, per 100 lb.	2.90
Com. wire nails, base per keg	2.10

* Net base, including boring and cutting to length.

CINCINNATI

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.00c.
New billet reinforc. bars	3.00c.
Rail steel reinforc. bars	3.00c.
Hoops	3.90c.
Bands	3.20c.
Cold-fin. rounds and hex.	3.35c.
Squares and flats	3.82c.
Hot-rolled annealed sheets (No. 24)	3.75c.
Galv. sheets (No. 24)	4.00c.
Hot-rolled sheets (No. 10)	3.30c.
Structural rivets	4.30c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (10 to 49 kegs)	2.65
Larger quantities	2.50
Cement c't'd nails, base 100-lb. keg	2.95
Chain, per 100 lb.	10.25
	Net per 100 Ft.
Seamless steel boiler tubes, 2-in.	$15.87
4-in.	34.57
Lap-welded steel boiler tubes, 2-in.	15.12
4-in.	32.98

BUFFALO

	Base per Lb.
Plates and struc. shapes	3.20c.
Soft steel bars	3.20c.
Reinforcing bars	2.95c.
Cold-fin. flats and sq.	3.00c.
Rounds and hex.	3.00c.
Cold-rolled strip steel	5.25c.
Hot-rolled annealed sheets (No. 24)	3.35c.
Galv. sheets (No. 24)	3.75c.
Bands	3.30c.
Hoops	3.55c.
Hot-rolled sheets (No. 10) 48-in. and narrower	3.00c.
Wider than 48-in.	3.25c.
Com. wire nails, base per keg	$2.40
Black wire, base per 100 lb.	3.25

BOSTON

	Per Lb.
Beams, channels, angles, tees, zees	3.00c.
H beams and shapes	3.00c.
Plates—sheared, tank and univ. mill, ¼ in. thick and heavier	3.00c.
Floor plates, diamond pattern	5.25c.
Bar and bar shapes (mild steel)	2.90c.
Bands 3/16 in. thick and No. 12 ga. incl.	3.40c.
Hoops, No. 14 ga. and lighter	4.90c. to 5.40c.
Half rounds, half ovals, ovals and bevels	4.15c.
Tire steel, rd. edge 1⅛ x ⅛ in. and larger	4.50c.
Smaller sizes	4.75c.
Cold-finished rounds and hexagons	3.60c.
Cold-rolled strip steel	5.20c.
Cold-finished squares and flats	4.10c.
Blue annealed sheets, No. 10 ga.	3.15c.
One pass cold-rolled sheets No. 24 ga.	3.50c.
Blued stove pipe sheets, No. 24 ga.	3.90c.
Galvanized steel sheets No. 24 ga.	4.90c.
Lead coated (long ternes) No. 24 ga.	5.00c.
Black wire, base per 100 lb., 2500 lb. or less	3.25c.
Over 2500 lb.	3.25c.

PACIFIC COAST

	Base per Lb.		
	San Francisco	Los Angeles	Seattle
Plates, tank and U.M.	2.80c.	3.30c.	3.00c.
Shapes, standard	3.15c.	3.30c.	3.00c.
Wide-flanged beams and columns	3.25c.	3.30c.	3.50c.
Soft steel bars	3.15c.	3.30c.	3.00c.
*Reinforcing bars	3.00c.	3.00c.	3.00c.
Hot-rolled annealed sheets (No. 24)	3.80c.	4.20c.	4.25c.
Hot - rolled sheets (No. 10)	3.18c.	3.80c.	3.50c.
Galv. sheets (No. 24)	4.40c.	4.50c.	4.75c.
*Struc. rivets, ⅛ in. and larger less than 100 lb.	5.75c.	6.00c.	5.25c.
*Cold finished steel Rounds	5.50c.	5.50c.	5.50c.
Squares and hexagons	6.75c.	6.75c.	6.75c.
Flats	7.25c.	7.25c.	7.25c.
Common wire nails —base per keg less carload	$2.40	$2.40	$2.50

*Subject to deductions for quantity.

PLANT EXPANSION AND EQUIPMENT BUYING

NEW ENGLAND

Hartford Brewery Co., Hartford, Conn., H. L. Pierce, president, has taken over buildings, Nos. 39 and 41, on Pope Park Road, formerly occupied by Hartford Rubber Works, and will remodel for new plant. Plans also are under way for erection of one and one-half story unit on adjoining site for bottling works. Cost about $500,000 with machinery.

Providence Journal Co., Providence, R. I., has awarded general contract to James Stewart & Co., 230 Park Avenue, New York, for new three-story and basement printing and publishing plant, 110 x 266 ft. Cost over $500,000 with machinery. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer.

Connecticut Wheel & Rim Co., New Haven, Conn., has been organized, capital $50,000, by William J. Carney, 675 Chapel Street, and Edward W. Byron, 82 Mansfield Street, to manufacture automobile rims, wheels, etc.

Salem Oil & Grease Co., 60 Grove Street, Salem, Mass., has plans for new six-story and basement processing, storage and distributing plant, 62 x 75 ft. Cost over $60,000 with equipment. Smith & Walker, 80 Boylston Street, Boston, are architects.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 13 for seamless phosphor bronze shells and head steel shells (Schedule 165) for Newport, R. I., Navy Yard.

NORTH ATLANTIC

Interboro Beverage Corpn., 28 George Street, Brooklyn, plans four-story addition to brewery, 100 x 200 ft. Cost about $400,000 with equipment. Shampan & Shampan, 188 Montague Street, are architects. Edward Bloomenkrantz is president.

International Business Machines Corpn., 270 Broadway, New York, manufacturer of calculating and bookkeeping machines, typewriters, parts, etc., has authorized expansion and improvements in main works at Endicott, N. Y., and branch plants at Dayton, Ohio, and Washington, including new equipment.

Supervising Architect, Treasury Department, Washington, asks bids until June 21 for two new power boilers and equipment for quarantine station, Hoffman Island, N. Y.

International Scientific Developments, Inc., Great Neck, L. I., has been organized, capital $50,000, by John A. Rietman, 215 Lakeville Road, and associates, to manufacture electrical machinery and parts, mechanical appliances, etc.

Katzman & Strober, Inc., 1182 Flushing Avenue, Brooklyn, metals and metal products, has plans for new one-story plant unit, 70 x 100 ft. Cost about $24,000 with equipment. W. Richter, 301 Elmwood Avenue, is architect.

Zenda Gold Mining Co., 135 William Street, New York, has acquired mining properties near Leadville, Colo., and plans early operation, with installation of mining and mill equipment, power facilities, mechanical-handling equipment, etc.

Beer Servitor, Inc., New York, recently organized to manufacture beverage dispensing equipment, has leased 10,000 sq. ft. in new building of New York Port Authority, 111 Eighth Avenue, for assembling and distributing plant.

Lion Brewery, Columbus Avenue and 108th Street, New York, has plans for addition, including improvements in present brewery. Cost over $45,000 with equipment. A. A. Tearle, 14 West Forty-fifth Street, is architect.

K. & S. Stoker Corpn., Middletown, N. Y., has been organized by Charles T. Kellogg, 17 Mountain Avenue, and A. Leigh Smith, R.F.D. No. 3, both Middletown, to manufacture stokers and other heating equipment.

Electrical Metal Products, Inc., Brooklyn, has been organized by Max S. Morgenstern, 1168 Fifty-fifth Street, and Morris Tenberg, 526 Bedford Avenue, to manufacture electric lighting fixtures and equipment.

Harrison Beverage Co., 500 Harrison Avenue, Harrison, N. J., has plans for two-story addition, 80 x 86 ft. Cost about $80,000, of which $50,000 will be expended for equipment. Kolb & Miller, 31 Union Square, New York, are architects and engineers.

New Jersey Terminal & Warehouse Corpn., 801 Newark Avenue, Elizabeth, N. J., plans new storage and distributing units, with installation of elevating, conveying, loading and other mechanical-handling equipment. Fund of $253,000 is being arranged for work.

Cylinder Mfg. Co., Nutley, N. J., has been organized by Albert C. and Robert E. Zilske, 83 Wharton Avenue, capital $50,000, to manufacture textile machinery and parts.

Rahway Valley Joint Meeting, 37 Elm Street, Westfield, N. J., William Darroch, secretary, asks bids until June 22 for low-lift pumping machinery and accessory equipment, screen chamber equipment, etc., for sewage treatment works. Clyde Potts, 30 Church Street, New York, is consulting engineer.

Chambon Corpn., 911 New York Avenue, Union City, N. J., manufacturer of rotary printing presses, parts, etc., has adopted full time production schedule, recalling regular working force.

J. Lapelosa, 171 Remsen Street, New Brunswick, N. J., manufacturer of paper makers' supplies, has asked new bids on general contract for two-story and basement plant, 60 x 125 ft. Cost about $40,000 with equipment. H. G. Bach, 63 Shureman Street, is architect.

Thomas Devlin Mfg. Co., Twenty-second Street and Sedgley Avenue, Philadelphia, manufacturer of plumbing equipment, fittings and supplies, has adopted full production schedule on three eight-hour shift basis at plant at Burlington, N. J., adding about 100 men to working force.

SKF Industries, Inc., Front and Erie Streets, Philadelphia, has let general contract to Turner Construction Co., Architects Building, for one-story addition. Cost over $85,000 with equipment. Headquarters are at 40 East Thirty-fourth Street, New York.

Bonney Forge & Tool Works, Allentown, Pa., manufacturer of wrenches, tools and other drop forgings, has organized Gray-Bonney Tool Co., Ltd., of Canada, a subsidiary, in cooperation with Gray Forgings & Stampings, Ltd., Toronto, manufacturer of kindred equipment, to operate a Canadian works. Plant will be established in conjunction with that of Gray company, St. Clarens Avenue, Toronto, where increased facilities will be arranged.

Doehne Brewery, Harrisburg, Pa., C. A. and G. L. Doehne, heads, will make extensions and improvements, including installation of additional equipment.

Buck Mountain Coal Mining Co., Gowen City, near Hazleton, Pa., plans rebuilding of coal breaker at local mining properties, recently destroyed by fire. Loss over $100,000 with machinery.

John J. Felin & Co., 4142 Germantown Avenue, Philadelphia, meat packers, have let general contract to Frank G. English & Son, 1608 North Carlisle Street, for addition. Cost over $100,000 with equipment. W. E. S. Dyer, Land Title Building, is architect and engineer.

Trestle Mfg. Co., Inc., Lockport, N. Y., has been organized by John Berent, 477 Pine Street, and associates, to manufacture mechanical equipment and parts.

New York State Electric & Gas Corpn., Ithaca, N. Y., plans power distributing plant and transmission lines at Clifton Park, N. Y., and vicinity. Cost over $60,000 with equipment.

SOUTH ATLANTIC

Board of District Commissioners, District Building, Washington, asks bids until June 12 for one power press; one 20 hp. crawler-type tractor; until June 13, one motor-driven drying tumbler; until June 16, one electric-heated core oven, two-car capacity; one similar oven, one truck capacity; two oven cars and one oven truck.

Pure Oil Co., Lynchburg, Va., plans bulk oil storage and distributing plant. Cost over $25,000 with tanks and equipment. Company headquarters are at 35 East Wacker Drive, Chicago.

Carolina Brewing Co., Columbia, S. C., recently organized by O. Lee Gordon, Columbia, and associates, plans to begin work in July on new local plant, including main brew-house, bottling works, boiler plant and other units. Cost about $300,000 with machinery. Proposed to build similar works in North Carolina later.

General Purchasing Officer, Panama Canal, Washington, asks bids until June 12 for two sump pumps, cast iron soil pipe fittings, malleable iron railing fittings, 1500 lb. iron or steel washers, 3600 steel hose clamps, brass unions, reducing valves, 1000 lb. tram nails, 4320 expansion anchors, 1000 lb. drill steel and other supplies (Schedule 2875); until June 14, standard track rail, standard clips for track system, switching equipment for power substation, switches and accessories, etc. (Schedule 2874).

Joseph D. Thorpe, Hialeah, Fla., is at head of project to operate a local brewing plant. Two-story building has been acquired and will be remodeled. Cost about $50,000 with equipment.

Procurement Division, Veterans' Administration, Washington, asks bids until June 12 for one vertical water storage tank, 600 gal. capacity (Proposal 535-M).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until June 13 for carbon and high-speed twist drills (Schedule 185), about 1900 hacksaw frames (Schedule 172), six air compressors and spare parts (Schedule 186), admiralty metal condenser tubes (Schedule 177), motor-driven pumps and spare parts (Schedule 88), ventilation fan equipments and electrical spare parts (Schedule 187), aluminum alloy, sheet and bar, and ingot aluminum (Schedule 189), 121,500 lb. pig lead, 108,400 lb. sheet lead (Schedule 175), all for Eastern and Western yards; wire springs (Schedule 201) for Brooklyn and Mare Island yards; 10 steam-driven cargo winches and spare parts (Schedule 178) for Mare Island yard; 250 aluminum chairs (Schedule 166) for Mare Island and Puget Sound yards; tool steel (Schedule 200) for Philadelphia yard; thrust bearings, spare shoes and collars (Schedule 184), main condensate pumps and main circulating pumps, vertical centrifugal type, turbine-driven, with spare parts and special tools (Schedule 183) for Boston, Brooklyn, Philadelphia and Puget Sound yards.

CENTRAL DISTRICT

Victor Brewing Co., Jeannette, Pa., J. F. Dietrich, secretary, is planning early expansion, including additional brew-house, bottling and other equipment. Cost over $125,000 with machinery.

Joseph S. Finch & Co., Inc., Clark Building, Pittsburgh, distiller, has plans for extensions and improvements in plant at Schenley, Pa., including two-story unit, 62 x 122 ft., for bottling and other service, one-story addition to power house, and remodeling present structures. Cost about $100,000 with equipment. Carl J. Kiefer, Schmidt Building, Cincinnati, is consulting engineer.

Babcock & Wilcox Tube Co., Beaver Falls, Pa., manufacturer of seamless steel boiler tubes, subsidiary of Babcock & Wilcox Co., New York, is advancing production schedule, recalling about 100 men. Orders on hand are larger than at any time during past two years.

Ingram-Richardson Mfg. Co., Beaver Falls, Pa., manufacturer of enameled iron products, is considering extensions and improvements, including additional equipment. Cost over $50,000 with machinery.

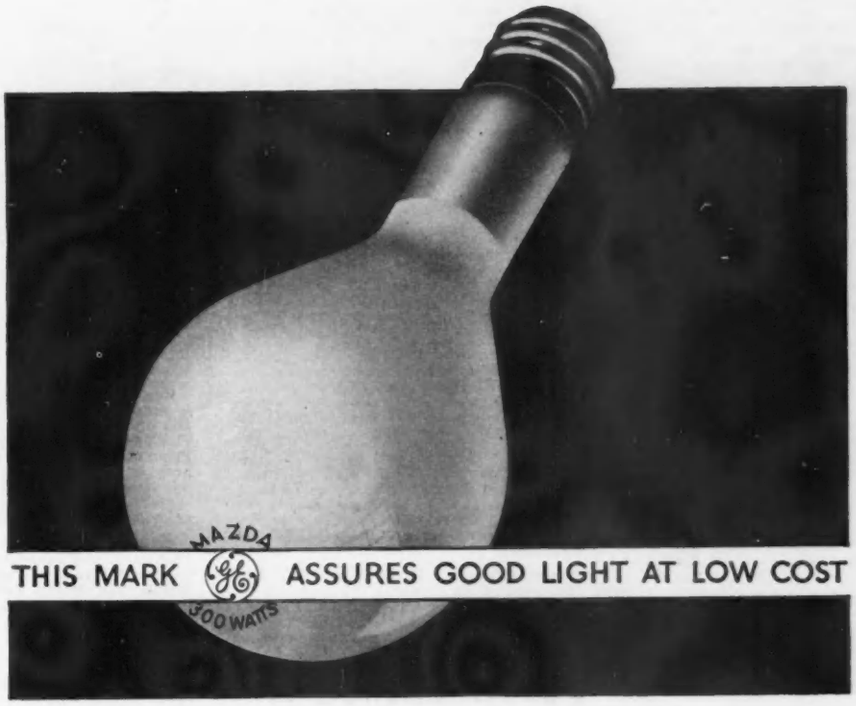
Fremont Oil Co., Fremont, Ohio, is planning new bulk oil storage and distributing plant. Cost about $30,000 with tanks and other equipment.

Oakwood Electrical Mfg. Co., Dayton, Ohio, care of R. E. Cowden, 714 Union Trust Building, incorporator and representative, has been organized to manufacture electrical equipment and devices. L. A. Raterman, Dayton, is interested in new company.

Department of Public Service, Broad and Water Streets, Columbus, Ohio, W. P. Hallencamp, director, is considering plans for municipal hydroelectric power station at Griggs dam, for electric light and power service. Cost close to $150,000 with equipment.

City Machine & Tool Works, Dayton, Ohio, manufacturer of special machinery, tools, dies, etc., has recently acquired controlling interest in Sheffield Machine & Tool Co., same city, manufacturer of gages and kindred equipment, and will be active in management. C. H. Reynolds, Detroit, heretofore associated with both companies, is head.

Biggs Boiler Works Co., Akron, Ohio, is developing maximum production schedule, with



General Electric manufactures lamps for every lighting purpose. Fleet owners find General Electric MAZDA Auto Lamps are economical and promote safe driving.

If wasted lighting current
WENT UP IN SMOKE

WHERE there is smoke there is waste—and you soon take steps to check it. And if wasting lighting current drifted away like smoke, you would stop it just as quickly. But waste in lighting is not so easily detected. That's why General Electric's lighting research specialists pass along these money-saving facts about light:

1. Dirt and dust decrease the amount of light as much as 25 to 30% in a month's time. Bulbs and reflectors should be cleaned regularly, on a schedule.
2. Dark walls and ceilings eat up light. Some grays, for example, eat up as much as 68% of the light.
3. Voltage of lamps should be in exact step with voltage of the lighting circuit. If it isn't, you'll either get less light than you should or your bulbs will burn out too soon. Your lighting company will be glad to check this for you.
4. Good lamps don't waste current. Inferior lamps do. Make sure only good lamps of standard make are in every socket. It pays. You can take all the guess-work out of lamp-buying by looking for the General Electric monogram.

Faulty illumination is a direct or contributing cause of 25% of all industrial accidents. That's why we suggest you route this information to those responsible for your lighting.

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GENERAL ELECTRIC
MAZDA LAMPS

day and night shifts. Majority of output is given over to metal beer tanks, as well as order from Government for metal buoys.

Department of Public Service, Canton, Ohio, R. B. Kelley, director, is planning purchase of turbine pumping equipment and accessories for municipal water system.

Denison Engineering Co., Delaware, Ohio, manufacturer of pumping machinery and parts, conveying equipment, etc., plans rebuilding part of plant recently destroyed by fire. Loss over $65,000 with equipment.

Zanesville Brewing Co., Zanesville, Ohio, affiliated with Ohio Ice Co., same place, is planning remodeling and expansion program at former plant of Star Ice & Storage Co., including additional equipment, tanks, etc. Cost over $100,000 with equipment.

Board of Public Works, City Hall, Fort Wayne, Ind., plans call for bids for new high-pressure steam turbine unit, about 15,000 kva., with auxiliary equipment, for municipal electric light and power plant. Hoad, Decker, Shoecraft & Drury, Ann Arbor, Mich., are consulting engineers.

P. R. Mallory Co., 3029 East Washington Street, Indianapolis, manufacturer of electrical equipment, is developing capacity schedule with day and night shifts, employing about 900 persons.

Diamond Lake Bottling Works, Cassopolis, Mich., has awarded general contract to Haynes & Jones, Cassopolis, for two-story bottling addition to brewing plant. Cost over $40,000 with equipment.

Henry Devlin Co., 301 Paterson Building, Flint, Mich., has been organized by Henry Devlin and associates to manufacture mechanical equipment and devices.

Power Roller Bearing Co., 3040 Hart Street, Detroit, is running on capacity three-shift day schedule, with increased working force.

Campbell Stone Co., Afton, Mich., plans rebuilding lime and limestone plant recently destroyed by fire. Loss over $85,000 with machinery.

Dailey Liquid Malt Extract Co., 1521 St. John Street, Flint, Mich., recently chartered, has plans for new brewery. Cost over $175,000 with machinery.

Contracting Officer, Material Division, Wright Field, Dayton, Ohio, asks bids until June 12 for one motor-driven radial drill press (Circular 678), shafts, springs, pivot, brackets, spavers, fuselage assemblies and other aircraft equipment (Circular 716), 1,152,000 ft. extra flexible cable (Circular 705), one portable liquid oxygen generator (Circular 722), 148 portable electric power plants (Circular 675), 185 bomb rack assemblies and 60 flare rack assemblies (Circular 710).

MIDDLE WEST

Columbia Gas Machine Mfg. Co., Room 1600, 100 North La Salle Street, Chicago, has been organized by Max E. Miller and Herman J. Goldberg, to manufacture gas machinery and parts.

Bastian-Blessing Co., 240 East Ontario Street, Chicago, manufacturer of pumping machinery, cooling equipment, etc., for breweries, has advanced operations to 12-hr. day, with increase in working force.

Hormel Packing Co., Austin, Minn., meat packer, has asked bids on general contract for three-story and basement addition, 54 x 285 ft. Cost over $70,000 with equipment. H. Peter Henschien, 59 East Van Buren Street, Chicago, is architect and engineer.

Minneapolis Brewing Co., Minneapolis, has begun expansion and modernization program, including additional equipment. Cost over $65,000 with machinery.

Quartermaster, Sixth Corps Area, Chicago, asks bids until June 12 for hydraulic gasoline fueling system for Government hangar at municipal airport (Circular 4).

Common Council, Frederika, Iowa, is considering erection of a municipal electric light and power plant. Cost over $50,000 with equipment.

Missoula Brewing Co., Missoula, Mont., William Steinbrenner, general manager, is considering one-story addition, 60 x 95 ft., for bottling. Cost about $45,000 with equipment.

Klemm Automotive Products Co., 1302 North Halsted Street, Chicago, manufacturer of automobile equipment, oil filters, etc., has arranged with Faith Mfg. Co., Ltd. of Canada, Wellington Street West, Toronto, for production of its line of oil filters for Canadian trade; increased manufacture will be carried out at last noted works.

Gro-kin Auto Lock Corpn., 122 South Michigan Avenue, Chicago, has been organized by Maurice S. Cohen and associates, to manufacture locks and locking devices for automotive service.

Bureau of Reclamation, Denver, asks bids until June 13 for bronze guides, guide anchor rods, gate plates, gate hangar anchors and other mechanical equipment.

Michael Yundt Co., Waukesha, Wis., manufacturer of bottle washing machinery, has plans for a machine shop addition which will increase area of plant 100 per cent. More space is needed to handle orders from breweries and milk-handling plants.

General Engineering Corpn., Racine, Wis., has been incorporated with $25,000 capital stock to manufacture mechanical and electrical devices. Manufacturing space will be leased. William F. Sawyer, 1440 Main Street, is president and general manager.

Sauk City Brewing Co., Sauk City, Wis., has purchased former local tractor plant and will remodel into brewery at cost of $45,000, including new high pressure boiler, tanks and other equipment. Architects Clas & Clas, 759 North Milwaukee Street, Milwaukee, are in charge.

Oconto Brewing Co., Oconto, Wis., has plans by W. C. Weeks, Inc., architect, 720 Ontario Avenue, Sheboygan, Wis., for remodeling brewery, adding new boiler house, bottling house, cooper shop, garage, etc. Cost about $40,000 with equipment.

Hydraulic Mfg. Co., Stoughton, Wis., has been incorporated by Dean G. Thomas, R. J. Anderson and Frederick Usher to manufacture hydraulic speed controls and other mechanical specialties. Production plans are in process.

SOUTH CENTRAL

Blue Seal Brewing Co., Shreveport, La., recently organized, capital $500,000, by George R. Mitchell, Alexandria, La., and associates, has taken over local buildings and will remodel for brewery. Cost about $100,000 with machinery.

Board of Trustees, Louisiana State University, Baton Rouge, La., plans addition to steam power plant for central heating service, pipe lines, etc.; extensions in cold storage and refrigerating plant, and new two-story arts and science building. Work will be carried out in connection with expansion program to cost $1,777,000; fund in that amount is being arranged.

Common Council, Tuscumbia, Ala., is considering installation of a municipal electric light and power plant. Cost over $60,000 with equipment. W. L. Farr, mayor, is active in project.

Tennessee Beverage Co., 11 West Butler Street, Memphis, Tenn., J. B. Schorr, head, is considering extensions and improvements, including additional equipment. Cost over $75,000 with machinery. Joseph T. Wallace, Bank of Commerce Building, is architect.

C. C. Flowers, Kilgore, Tex., is at head of project to build an oil refinery near Atmore, Ala. Cost over $100,000 with equipment. Company will be organized to carry out development.

SOUTHWEST

Phillips Petroleum Co., Bartlesville, Okla., has plans for new oil refinery at Okmulgee, Okla. Cost about $160,000 with equipment.

Brown Heat & Power Co., Webb City, Mo., has been organized by John H. Brown, Fort Scott, Kan., and associates, to manufacture steam generating equipment, parts, etc.

Common Council, Cotton Plant, Ark., plans installation of electric pumping machinery, pipe lines, etc., for new municipal waterworks. Dickinson & White, Rector Building, Little Rock, Ark., are consulting engineers.

Midwest Air-Conditioning Corpn., St. Louis, has been organized by P. O. Eisenbeis, 660 West Polo Drive, and associates, to manufacture mechanical draft equipment, parts, etc.

State Board of Affairs, State Capitol Building, Oklahoma City, Okla., will soon take bids for water supply system at institution at Taft, Okla., including elevated steel tank and tower, pumping machinery, filtration equipment, pipe lines, etc. Layton, Hicks & Forsyth, Braniff Building, Oklahoma City, are architects.

Kirk Oil & Refining Co., Abilene, Tex., T. A. Kirk, head, is considering new oil refinery on local site. Cost about $65,000 with equipment. Storage and distributing plant, with steel tanks, pumping station, etc., will be built.

Common Council, Woodville, Tex., plans installation of pumping machinery, pipe lines and other equipment for municipal water plant. Cost about $25,000. J. Rady, 301 Provident Building, Waco, Tex., is consulting engineer.

PACIFIC COAST

B. F. Sturtevant Co., 2530 Sixth Street, Berkeley, Cal., manufacturer of ventilating equipment, mechanical draft apparatus, etc., has asked bids on general contract for one-story addition. Headquarters are at Hyde Park, Boston.

San Bernardino Brewing Co., San Bernardino, Cal., recently organized by Frank J. Solt and Ned Sparks, San Bernardino, has plans for three-story plant, 100 x 250 ft. Cost about $200,000 with machinery. Gay Engineering Co., 2650 Santa Fe Avenue, Los Angeles, is engineer.

Santa Fe Brewing Co., Los Angeles, recently organized by Robert A. Horowitz, 448 South Hill Street, and Frank J. Kashare, capital $1,000,000, has engaged Merrill & Wilson, Petroleum Securities Building, architects, to prepare plans for remodeling two buildings purchased on Santa Fe Avenue, and erection of three-story addition, 140 x 165 ft. Cost about $275,000 with equipment.

F. M. Chrisman, 1023 Russ Building, San Francisco, and associates have applied for permission to erect hydroelectric power plants on Middle and North Forks of American River in Placer and Eldorado counties, consisting of three plant units, with transmission lines, switching stations and other structures. Cost over $1,000,000.

Hemerich Brewing Co., 2918 Airport Way, Seattle, has leased plant on East Marginal Way and will remodel for new brewery. Cost about $65,000 with equipment.

United States Products Co., Race Street and Moor Park, San Jose, Cal., has awarded general contract to R. O. Summers, 17 North First Street, for one-story canning plant, 105 x 180 ft. Cost over $60,000 with equipment. Binder & Curtis, 35 West San Carlos Street, are architects.

Heber Public Utility District, Heber, Cal., plans installation of centrifugal pumping machinery and auxiliary equipment, 16,000-gal. metal tank on tower, pipe lines, etc., for new waterworks. Philip W. Knights, El Centro, Cal., is engineer.

Harry Rowe, 5416 Shilshole Avenue, Seattle, plans two-story foundry and pattern shop, 40 x 80 ft., and two-story mechanical shop, same size.

FOREIGN

Showa Steel Works, Darien, Manchuria, will carry out expansion and improvements, including installation of considerable new machinery. Company is taking over Anshan Works in district noted. Cost over $500,000.

Cerveceria Cuauhtemoc, Ltd., Monterey City, State of Nuevo Leon, Mexico, brewer, will take bids at once for proposed new plant near Mexican boundary line, Southern California. Cost over $400,000 with equipment.

Nederlandsch Indische Radio Omroep Maatschappij, Batavia, Java, known as NIROM, has secured concession for radio broadcasting in Dutch East Indies from Government of Netherlands, and will build addition to station at Tandjong, with installation of generating, broadcasting and other equipment. Company has secured monopoly for such operations in territory noted and plans other broadcasting plants.

Toyo Woolen Yarn Co., Ltd., Tokyo, Japan, an interest of Okura Corpn., same place, has arranged for increase in capital from 1,000,000 to 5,000,000 yen (about $250,000 to $1,250,000), and will use part of fund for expansion at mill, including additional machinery. Cost over $400,000 with equipment.

Homestead Valve Mfg. Co., Coraopolis, Pa., has appointed the following representatives for the sale of its vapor spray machine used for automotive, industrial, and building cleaning: Mine & Smelter Equipment Co., Phoenix, Ariz.; R. S. Armstrong & Brother Co., Atlanta, Ga.; Nixon-Hasselle Co., Chattanooga, Tenn.

Inland's Demonstration of Steel at "A Century of Progress" Exposition

TO demonstrate that beauty and utility can be combined by using steel . . . to exhibit Inland products . . . to visualize the processes of making steel—these three aims are achieved by the Inland Exhibit at "A Century of Progress."

The exhibit is of steel—in execution as well as in purpose—of raw steel, no paint. The furniture is especially designed to demonstrate the beauty possible with steel. The ceiling and other portions of the exhibit show the utility of steel—visualize the rewards of tradition-breaking design.

The floor is a demonstration of how appearance and safety can at last be combined at economical cost by the use of Inland 4-Way Floor Plates. Views of steel making processes are carved on the steel sheets used for the walls. Colored spotlights bring out the fiery beauty of steel in the making. Another portion of the exhibit shows the progressive steps in the development of the railroad rail. And a moving picture portrays Inland's great Continuous Strip Mill.

In short, the Inland Exhibit visualizes A Century of Progress in the development and application of steel. You are cordially invited to visit this exhibit which is in Booths 8 and 9, Group D, Unit No. 2, First Floor, General Exhibits Building. INLAND STEEL COMPANY, 38 South Dearborn Street, Chicago, Illinois.

INLAND STEEL

ABLE SERVANT OF THE CENTRAL WEST

Sheets Strip Plates
Bands Structurals Piling

Rails Track Accessories
Bars Rivets Billets

What the User Should Know About Free-Cutting Steels

(*Concluded from Page* 904)

sary they should be obtained through some other measures — of which a number are available.

Sulphur.—The effect of sulphur is much the same in either Bessemer or open-hearth steel. It begins to be effective for machinability at about 0.060 per cent and its effect continues to be more free-cutting up to at least 0.300 per cent. The curve slopes gradually upward and, while it is not a steep curve, yet the difference in machinability can be readily detected for a difference of 0.030 or 0.050 per cent.

In the very high sulphur contents, the steel maker's cost and difficulties become increasingly heavy, without a very pronounced return in improved machinability. While the exact point can hardly be said to have been accurately determined, yet there is some point as sulphur is increased where the purchaser cannot afford to pay the increased cost because such cost becomes disproportionate to the return in machinability. Under present conditions it would seem that this point is somewhere around a sulphur content of 0.250 per cent.

Silicon.—While silicon present as pure iron silicide may be supposed to be somewhat favorable to machinability, yet the fact of the matter is that it is impracticable to add silicon in any form without getting in the steel silicates, which are sharply unfavorable to machinability. There are in our possession absolutely definite figures which prove that machinability decreases as the silicon content increases.

Some metallurgists prefer to specify silicon in certain open-hearth screw steel grades; but if they insist on so doing it should be with the knowledge that they are working contrary to machinability with no adequate return in any other way.

Silicon is a highly beneficial element in higher carbon steels, but it distinctly does not belong in the field of lower carbon steels where screw steels are ordinarily found.

Aluminum. — Aluminum should be used sparingly, if at all, in the manufacture of screw steels. It has the two-fold effect of rendering the steel tougher under cold work and of promoting the formation of aluminum oxide inclusions, which must always be regarded with suspicion as unfavorable to long tool-life.

Inclusions.—From a certain viewpoint it may be plausibly argued that tool wear does not result so much by the abrasive action of a few scattered inclusions, as from the energy requirements of rupturing the ferrite grains. It seems beyond argument that in addition to inclusions there is in steel a widespread dispersion of extraneous particles intimately mixed with the ferrite but too small to be seen by the microscope. These dispersed particles increase the amount of energy required to deform the ferrite in the operation of cutting, and therefore contribute to poorer machinability and shorter tool life.

Summary

The manufacture of free-cutting steel in its most up-to-date aspect is a complex and curious admixture of practical "know-how" and of scientific knowledge. The practical knowledge is becoming more and more definite and the scientific background is growing rapidly in volume and helpfulness.

It was the intention of this article to help in dispelling the all-too-generally accepted idea that free-cutting steel is necessarily "rotten" steel in the sense of being poorly made. The fact of the matter is that good free-cutting steel must be very carefully made. There is more practical knowledge and more scientific metallurgical skill involved in making a really good heat of free-cutting steel than there is in the manufacture of steel for the crankshaft assembly of an airplane engine.

Arbitrary specifications are likely to defeat their own purpose. It is true of free-cutting steel, and of any grade of steel, and in fact of any article of commerce, that quality and serviceability will be raised to the highest practicable level and commercial costs will be reduced to the lowest possible minimum by a complete and frank interchange of information between purchaser and supplier.

It is in keeping with the eternal fitness of things that the metallurgist or the engineer or the shop superintendent will best serve his own personal interests and the interests of his own organization by seeking the best adjustment between raw material and fabricating requirements, and in so doing he will serve the supplier of the raw material; and above all in seeking such adjustments he will be making a considerable personal contribution to the general welfare of human society.

Enameling in Automatic Gas Furnaces

(*Concluded from Page* 902)

the ware again hung on the furnace conveyor. This is repeated until two white coats have been sprayed and burned on.

The ground coat remains in the hot zone for from 3½ to 4½ min. where it is subjected to a temperature of approximately 1600 deg. F. Each white coat is burned on at about 1580 deg. F. and remains in the hot zone for only 1½ min. The finished ware is finally inspected and then sent to the stock room or directly to the assembly lines.

Carbon Steel Beer Keg Is Cold-Formed and Welded

(*Concluded from Page* 900)

barrel and the bilge. The top tap is also made of plain carbon steel. Both the bung and the tap are closed in the conventional manner by means of wooden plugs or stoppers. After all welding operations have been completed the keg is coated inside with a specially prepared lining composition, which is applied mechanically and which prevents beer from coming in contact with the steel. This composition gives neither taste, odor nor color to the beer.

Interesting facts concerning these kegs are that they are made entirely of carbon steel; all forming operations are performed cold; fabrication of all seams and joints is performed either by arc, resistance, flash or spot welding. The outside of the keg may be painted to suit the owner so that his kegs are rapidly identified. Severe tests made by dropping these barrels, filled, from pronounced heights to concrete roadways and upon obstacles have proved the sturdiness of this barrel construction and the effectiveness of the composition lining.

Shipments of manganese ore, containing 35 per cent or more manganese, from mines in the United States amounted to 17,777 gross tons in 1932, according to a report of the United States Bureau of Mines. This total compares with 39,242 tons in 1931. Shipments in 1932 consisted of 9963 tons of metallurgical ore, 7012 tons of battery ore and 802 tons of miscellaneous ore. In addition to the ore shipped from mines in the United States, there were shipments of 2302 tons from Porto Rico to the United States, compared with 2374 tons in 1931. Montana was the chief producing State last year, having supplied 87 per cent of the total shipped. The remainder of the shipments came from Alabama, Arkansas, Georgia and Virginia.

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Steel Production in the Valleys Now Close to 50 Per Cent of Capacity

YOUNGSTOWN, June 6.—Beginning the third month of expanding business, the Valley steel industry is approaching a 50 per cent operating rate with a growing opportunity to report financial profit in the second quarter. Most of the steel makers in the district went into black ink during May in spite of the low price level now prevailing, and the prospect of higher prices during the third quarter is most encouraging.

Analysis of May shipments by at least two large companies indicates that automotive tonnage during the month was only slightly heavier than in April, while aggregate orders exceeded the previous month's total by as much as 50 per cent in some cases. Movement of tin plate out of the district last month was naturally much larger than it was in April, but increased consumption by a wide variety of consuming industries is the most encouraging factor in the current picture.

Heretofore releases have been almost entirely for immediate consumption, but a growing tendency to build up inventories has been more noticeable in the last week or two. The expiration of old low-priced contracts at the end of the month is expected to bring in more tonnage of this sort before July 1, resulting in sustained specifications over the remainder of the quarter. As July 15 is the last day steel companies are willing to ship against such releases, it seems rather certain that seasonal contraction in business will be delayed for another six weeks, if it comes at all.

The last fortnight has brought considerable improvement to the business of large Valley fabricating plants. Makers of sheet metal stampings are much busier, particularly on new lines which had not heretofore been pushed because of business uncertainty. Electric refrigerator production is well maintained and the radio industry is beginning to take steel again in fair volume. Makers of kitchen utensils and equipment are much busier and there is a better movement of steel for filing cabinets, shelving and the like. Production of steel office furniture has not increased materially, although distributors' stocks are being built up in some instances. Steel building trim and fixtures are also quiet. The brewing industry is still taking considerable material, although beer barrels and cases are reaching the commercial production stage rather slowly. Pipe continues dull in practically all lines, with a little distributer buying for stock building purposes reported.

Steel ingot production in the Valleys and nearby northern Ohio plants will reach 50 per cent of capacity this week, the highest level in more than two years. Improvement has been gradual and delayed at times by the inavailability of open-hearth furnaces. Ten steelworks and two merchant furnaces are in blast, the latter supplying ingot mold plants. Tin plate production is at virtual capacity this week, following resumption of the New Castle works of the American Sheet & Tin Plate Co. Sheet mills are engaged at 40 to 45 per cent, with strip at about the same rate. In many cases producers are able to book individual units for a full week ahead and on some special products deliveries are two weeks behind.

Finished steel prices are subject to little test, current buying being largely against old contracts. Although sheet and strip makers have opened their books for third quarter, they are not anxious to cover their customers. Final passage of the Industrial Recovery bill now in Congress is expected to clarify the situation. Pig iron prices are strong but buying is light. No. 1 heavy smelting steel is quoted at $12 to $12.50, but is not freely available at the higher level. An increasing amount of cold iron is being melted.

Continental Cartel Announces Semi-Finished Steel Prices

LONDON, ENGLAND, June 6 (*By Cable*).—British iron and steel demand is now reflecting the holiday influence. The outlook, however, seems more favorable and outputs are being gradually increased. Tinplate prices continue strong, paralleling the increasing price of tin, but orders as yet are moderate in aggregate.

The Continental Raw Steel Cartel has established the following base prices in gold pounds, F. O. B., per metric ton:

Ingots	£2 5s.
Billets	£2 7s.
Sheet Bars	£2 8s.
Steel bars	£3
Beams	£2 15s.
Plates	£3 18s.
Ship plates	£4 10s.

(Extra 5s. for 4 mm. and 7s. 6d. for 3 mm.)

The prices of bars and beams given above include a merchant rebate, per metric ton, of 2s. Plates and ship plates take a rebate of 2s. 6d. Sales offices will quote F.O.B. and merchants may sell C.I.F. provided they adhere to tariffs fixed by the Cartel for various ports in calculating the freight charges.

Polish mills have sold to Russia 50,000 tons of rolled steel for Sept. 1 delivery.

British Prices f.o.b. United Kingdom Ports

Per Gross Ton

Ferromanganese, export	£9		
Billets, open-hearth	£5	to	£5 7s. 6d.
Black sheets, Japanese specifications	£11		
Tin plate, per base box	17s.	to	17s. 6d.
Steel bars, open-hearth	£7 17½s.	to	£8 7½s.
Beams, open-hrth.	£7 7½s.	to	£7 17½s.
Channels, open-hearth	£7 12½s.	to	£8 2½s.
Angles, open-hearth	£7 7½s.	to	£7 17½s.
Black sheets, No. 24 gage	£8 10s.		
Galvanized sheets, No. 24 gage	£10 10s.	to	£10 15s.

Continental Prices f.o.b. Continental Ports

Per Metric Ton, Gold £ at $4.86

Billets, Thomas	£2 7s.		
Wire rods, No. 5 B.W.G.	£4 10s.		
Black sheets, No. 31 gage, Japanese	£11 5s.		
Steel bars, merchant	£3		
Beams, Thomas	£2 15s.		
Angles, Thomas 4-in. and larger	£2 16s.	6d.	
Angles, small	£2 18s.	6d.	
Hoops and strip steel over 6-in. base	£3 12s.	6d.	
Wire, plain, No. 8	£5 7s.	6d.	
Wire nails	£5 15s.		
Wire, barbed, 4-pt. No. 10 B.W.G.	£8 15s.		

British Steel Production Off in April

WASHINGTON, June 6.—Declines occurred in imports, exports and production of British iron and steel products in April compared with March, according to a report of the Commerce Department's Iron and Steel Division. Exports of these products for April amounted to 132,847 gross tons compared with 154,971 tons in March and 135,619 tons for February, it was reported. Imports for April totaled 70,891 tons compared with 96,963 tons in March and 77,959 tons in February. British production of pig iron in April amounted to 324,700 tons compared with 332,200 tons in March and 270,800 tons in February. Steel production registered 513,300 tons in April compared with 577,700 tons in March and 482,700 tons in February.